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UNIVERSITY OF CALIFORNIA

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ANNOUNCEMENT  
OF  
COURSES OF INSTRUCTION

IN THE COLLEGES OF LETTERS, SOCIAL  
SCIENCES, NATURAL SCIENCES, COMMERCE,  
AGRICULTURE, MECHANICS, MINING, CIVIL  
ENGINEERING, AND CHEMISTRY,

FOR THE ACADEMIC YEAR, 1907-08

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BERKELEY  
THE UNIVERSITY PRESS

1907



# COURSES OF INSTRUCTION OFFERED IN THE COLLEGES AT BERKELEY FOR THE ACADEMIC YEAR 1907-08.

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## **PHILOSOPHY.**

GEORGE H. HOWISON, M.A., LL.D., Mills Professor of Intellectual and Moral Philosophy and Civil Polity.

CHARLES H. RIEBER, Ph.D., Associate Professor of Logic, on the Mills Foundation.

HARRY A. OVERSTREET, A.B., B.Sc.(Oxon.), Associate Professor of Philosophy, on the Mills Foundation.

WILLIAM E. HOCKING, Ph.D., Assistant Professor of Philosophy.

FRANK S. WRINCH, Ph.D., Instructor in Psychology.

## **LOWER DIVISION COURSES.**

Although these courses properly fall within the first two years of undergraduate work, and are prerequisite, as specified below, to Upper Division Courses, they are all open as free electives to any student in the University.

### **1. Formal Logic.**

Associate Professor RIEBER and Assistant Professor HOCKING.

With especial reference to practice on division, definition, the forms and transformations of judgments, the syllogism, deductive and inductive, and fallacies.

3 hrs., either half-year. M W F. In four sections. Section I, 8; Section II, 9; Section III, 1; Section IV, 2.

**2. General Psychology.**

Dr. WRINCH.

The facts of consciousness, their classification and analysis, and their relations to the nervous system; with demonstrations in brain anatomy and in psychological experiment. The nature of personal identity, as the ground of the connection between mind and body.

3 hrs., either half-year. M W F, 3. (Course 3 should accompany or follow this course.)

**4. Ethics, Theoretical and Practical.**

Professor HOWISON and Assistant Professor HOCKING.

A general introduction to the subject, including a history and criticism of the leading ethical theories, followed by an application of results to the settlement of the more important questions of right and wrong in detail. Lectures, with reading of the principal ethical classics.

2 hrs., throughout the year. Tu Th, 10, with additional Conferences, for the readings, in sections. First half-year, Theoretical Ethics; second half-year, Practical Ethics: the Individual, the Family, the Civil Society, the State. The Conferences will be in charge of Assistant Professor HOCKING.

**29. Comparative Religions.**

Assistant Professor HOCKING.

A general introduction to the Philosophy of Religion, through a critical survey of the emergence and development of religious ideas, rites, and institutions, as found in the greater historic religions, especially those of Egypt and the East. Lectures, and assigned readings in the sacred books of the East.

2 hrs., throughout the year. Tu, Th, 11. Prerequisite: Consent of the lecturer, which must be obtained by personal application before the opening of the course.

**UPPER DIVISION COURSES.****3. History of Philosophy.**

Professor HOWISON and Associate Professor OVERSTREET.

Critical account, in outline, of the course of Western thought, with references to the thought of the East.

First half-year, Classical and Middle Age Philosophy; second half-year, Modern Philosophy.

3 hrs., throughout the year. M W F, 10. Lectures by Professor HOWISON. In addition, the class will be sectioned for Conferences, in charge of Associate Professor OVERSTREET. Prerequisite: One of the Lower Division Courses, preferably Course 1 or Course 4.

**6. Introduction to Psychological Experiment.** Dr. WRINCH.

Demonstration of characteristic groups of experiments, with individual practice in the use of psychological apparatus.

4 hrs., 2 units, throughout the year. Tu Th, 1 to 3. Prerequisite: Course 2.

**9. The Philosophy of Education.** Professor HOWISON.

The nature, aims, instruments, and methods of education, and its right organization in institutions. Lectures, supplemented by study of the chief educational classics, and by critical essays on them from the students.

2 hrs., throughout the year. S, 10 to 12. Prerequisite: Consent of the lecturer, obtained by application in person. (This course is listed in the Department of Education also.)

**10. Theory of Scientific Method.** Associate Professor RIEBER.

Based on a study of the standard writings on Induction, with the aim of attaining an exact knowledge of the methods of observational and experimental science, and a philosophic criticism of them.

3 hrs., first half-year. M W F, 8. Prerequisite: Course 1. (Courses 3 and 6 would be valuable auxiliaries.)

**\*13. Psychological Conference.** — — —.

Discussion of selected topics in psychology, in their historical setting, and as treated by writers of the present day.

2 hrs., consecutive, second half-year. Prerequisite: Courses 3 and 6. (It would be advantageous to have Course 4 also precede.)

**\*24. History of Psychology.** — — —.

Critical account of psychological theory and method, from Aristotle to the present time.

3 hrs., either half-year. Prerequisite: Course 2.

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\* Not to be given in 1907-08.

**27. The Psychology of Aesthetics.**

Dr. WRINCH.

A lecture course attempting the systematic investigation of the subject.

2 hrs., second half-year. Tu Th, 11. Prerequisite: Course 2. (Course 3 should also precede or accompany this course, if practicable.)

**30. The Algebra of Logic.**

Associate Professor RIEBER.

A critical investigation of the scope and value of the equational theory of judgment, based on a study of leading writers on Symbolic Logic.

3 hrs., second half-year. M W F, 8. Prerequisite: Course 1.

**31. The Philosophy of the State.**

Assistant Professor HOCKING.

An examination of the nature and functions of the State; of the sources of political power; of the relations between public and private welfare and initiative; of the notions of rights, freedom, and equality; of the responsibilities of the State regarding industrial, domestic, moral, and religious interests; and of the conditions of stability in a republic. Lectures, and assigned readings in the main texts of Political Theory.

2 hrs., throughout the year. Tu Th, 9. Prerequisite: Course 4.

**GRADUATE COURSES.**

To most of these, though they are intended primarily for graduates, thoroughly qualified undergraduates will be admitted. The qualifications for each are indicated in the several prerequisites.

**5. The Philosophy of Kant.**

Professor HOWISON.

The cardinal distinctions and doctrines of the system expounded and criticized.

2 hrs., throughout the year. Tu Th, 11. Prerequisite: Courses 1, 3, and 4; and the course should, if possible, be supplemented by Course 23. (Course 16 should also accompany this course, if not previously taken.)

**11. Theory of Knowledge: Logic as the Method of Truth.**

Associate Professor RIEBER.

Based on a study of the logical doctrines of Plato and Aristotle, Spinoza and Leibnitz, Fichte and Hegel, Lotze, Bradley, and Bosanquet; development and criticism of the leading theories of knowledge, aiming at a constructive result.

2 hrs., throughout the year. Tu Th, 8. Prerequisite: Courses 5 and 23, either previously completed or as accompaniment.



**15. Psychological Research.**

Dr. WRINCH.

The working out, by the methods of the laboratory, of special problems assigned individually for original investigation.

Not less than 9 hrs., throughout the year, 3 units each half-year; but at least 15 hrs., 5 units each half-year, recommended. Units and hours arranged with each student, at times within M Tu W Th F, 10-12 or 1-4. Prerequisite: Course 6, or its equivalent; permission to elect the course, obtained from the instructor in charge.

**16. Plato and Aristotle.**

Associate Professor OVERSTREET.

Introduction to their systems by a comparative study.

2 hrs., throughout the year. Tu Th, 3. Prerequisite: Courses 1, 3, and 4. A good reading knowledge of Greek, and familiarity with Latin, and with German or French, is desirable, though not for the present required. (This course may be counted toward the Major in Greek, by students who actually read the Plato and the Aristotle in the original.)

**17. Middle Age Philosophy, in connection with Alexandrian.**

Associate Professor OVERSTREET.

A critical study of Alexandrianism, especially as represented by Philo and by Plotinus; followed by a study of Scholasticism, particularly the systems of Aquinas and Scotus.

2 hrs., throughout the year. First half-year, the Alexandrian Schools; second half-year, the Middle Age Philosophy. Tu Th, 10. Prerequisite: Courses 1 and 3; with Courses 5 and 16 as accompaniment, if not previously taken.

**20. Philosophical Seminary.**

The DEPARTMENT STAFF.

Topics changed from year to year, upon conference among the teaching members, some one of whom will be made director for each year. Subject for 1907-08: Investigation of the fundamental problems of Metaphysics, with especial reference to leading solutions now current. Director, Professor HOWISON.

3 hrs., throughout the year. W, 7:30 to 10:30, p.m. Prerequisite: Graduate standing, a good reading knowledge of the languages necessary for a first-hand study of texts, and thorough acquaintance with the subjects of Courses 1, 2, 3, 4, and 10; permission to join the seminary, obtained from the director after conference.

**21. English Philosophy from Hobbes to Spencer.**

Associate Professor OVERSTREET.

A critical study of the development of empiricism.

3 hrs., first half-year. M W F, 10. Prerequisite: Courses 1 and 3.

**23. German Idealism after Kant: The Philosophy of Fichte, Schelling, and Hegel.**

Associate Professor OVERSTREET.

A study of the development of the Kantian philosophy in Germany, with especial reference to the system of Hegel.

3 hrs., second half-year. M W F, 10. Prerequisite: Courses 1 and 3, and the first half-year's work in Course 5, if this has not been completed previously. (A reading knowledge of German is of the highest importance for this course.)

**\*26. Advanced Ethics.**

Professor HOWISON.

Detailed critical discussion of the main problems of ethics, with critical essays by the class upon the ethical systems of leading philosophers and the chief ethical problems.

3 hrs., throughout the year. Prerequisite: Courses 3 and 4.

In addition to these, special lines of study will be arranged for qualified graduates who are candidates for higher degrees, or who wish to carry on advanced work.

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\* Not to be given, 1907-08.

**EDUCATION.**

ALEXIS F. LANGE, Ph.D., Professor of Education.

FLETCHER B. DRESSLAR, Ph.D., Associate Professor of the Science and Art of Teaching.

†W. SCOTT THOMAS, A.B., Examiner of Schools and Assistant Professor of Education.

\*FREDERIC ERNEST FARRINGTON, Ph.D., Assistant Professor of Education.

CHARLES EDWARD RUGH, M.L., Assistant Professor of Education.

THOMAS L. HEATON, B.L., LL.B., Lecturer in Education.

JOHN SWETT, A.M., Honorary Lecturer in Education.

Undergraduate and graduate courses are offered in the history and the theory of education, which may serve non-professional as well as professional purposes. It is believed that such courses provide instruction which is desirable for the ends of individual culture and training and as preparation for that intelligent participation in public and private education which good citizenship demands of educated men and women.

Seminar courses are intended to serve the purpose of graduate students who wish to engage in research in the field of education, and particularly those who are candidates for higher degrees.

The courses prerequisite to a Major Subject in the Department of Education are Philosophy 2, Philosophy 4, and either Philosophy 1 or Philosophy 24. The work of students taking their Major in Education should be elected only after consultation with the head of the department.

Special provision is made for the professional training of teachers, of three classes:

**A. Those preparing to become teachers in high schools and other schools of secondary grade.**

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† Absent visiting schools, second half-year, 1907-08.

\* Absent on leave, 1907-08.

For the conditions under which Recommendations for Teachers' Certificates of the high school grade are issued, see Joint Regulations of the Faculties Concerning Graduate Students, in the REGISTER. Requirement (b) *Professional Knowledge*, of those conditions, must be satisfied by twelve units in the Department of Education. For the year 1907-08 those units may be made up as follows:

- I. Either Education 4 (History of Education: Later Periods), 3 units; or Education 25 (The History of American Education), 3 units.
- II. Either Education 5B (The Principles of Secondary Education), 3 units; or Education 10A (Introduction to Pedagogy), 3 units; or Education 21 (The High School), 3 units.
- III. Either Education 18A (Language and Literature in Secondary Schools), 3 units; or Education 22A (The Art of Class Teaching), 2 units; or Education 26 (Introduction to Educational Method), 2 units.
- IV. Education 1A or 1B (The Practice of Teaching), 4 units.

It is very desirable that Philosophy 2 (General Psychology) be taken as preliminary to these courses or as a companion course with one or more of them. Students who have not had such preparation will be expected to take readings in Psychology in connection with Education 18 or 2A or 26. Philosophy 4 (Ethics, Theoretical and Practical), Philosophy 1 (Formal Logic), Philosophy 24 (History of Psychology), Education 3 (History of Education: Earlier Periods), and Education 5 (Theory of Education) are also desirable preliminary courses. Such preliminary courses are not, however, made prerequisite; and in case of need the whole of requirement (b) *Professional Knowledge* may be satisfied in the graduate year required of candidates for the teachers' recommendation. Students are advised to distribute the work over the two half-years of their graduate period, or, preferably, over their senior and graduate years, and to take the courses in divisions I, II, III, above, before the course in division IV.

**B. Those preparing to engage in school administration, to become principals or superintendents of public schools, or to teach in normal schools or in college departments of education.**

Special courses will be arranged to meet the needs of individual students; but these courses should ordinarily include:

- I. Philosophy 1 (Formal Logic), 3 units; Philosophy 2 (General Psychology), 3 units; and Philosophy 4 (Ethics, Theoretical and Practical), 4 units.
- II. Education 3 (History of Education: Earlier Periods), 3 units; and either Education 5A (Theory of Education), 3 units, or Education 16 (Selected Topics in the Theory and Practice of Education), 2 units.
- III. The courses required for the high school teachers' recommendation.
- IV. Special graduate studies, and particularly research in the field for which the student is preparing. Those preparing for the principalship or the superintendency should include courses 2A, 6, 12, 22A, and 22B.

C. Graduates of normal schools, who are making further preparation for teaching in elementary schools.

Hereafter the University will not recommend its graduates for grammar school certificates, except as those desiring such certificates shall have received their pedagogical training in connection with a normal school. Special courses will be arranged for students who have had such training and who may wish to pursue additional studies in Education.

#### UPPER DIVISION COURSES.

##### 3. The History of Education: Earlier Periods. — — —.

The development of educational thought and practice up to the close of the medieval period.

3 hrs., second half-year. M W F, 3. Prerequisite: Courses 2 and 4 in Philosophy.

##### 4. The History of Education: Later Periods. Professor LANGE.

The development of educational thought and practice from the Renaissance to the present, viewed as a phase of social progress. Lectures, discussions, brief individual studies in the history of American education.

3 hrs., first half-year. M W F, 8.

##### 25. The History of American Education.

Assistant Professor THOMAS.

An historical study of the leading ideas and ideals of American education and of the institutions in which they have been embodied. The course will deal more particularly with secondary and higher education.

Lectures, readings, and reports.

3 hrs., first half-year. M W F, 10.

**\*5A. The Theory of Education.**

Professor LANGE.

A study of fundamental principles, processes, and methods, with special reference to national culture and ideals. Lectures, discussions, expository exercises.

3 hrs., second half-year. M W F, 9. Prerequisite: Courses 2 and 4 in Philosophy.

**5B. The Principles of Secondary Education.**

Professor LANGE.

A study of the theoretical and the broader practical aspects of the secondary stage of education, with special reference to the American high school system. Lectures, topical study, interpretation of selected authorities, oral and written exercises with particular emphasis on adequate presentation.

3 hrs., first half-year. M W F, 10.

**6. School Systems.**

Assistant Professor THOMAS.

A study of the development and present status of typical European systems of education, particularly those of Germany and England.

Lectures, readings, and papers.

2 hrs., first half-year. Tu Th, 10. Prerequisite: Courses 2 and 4 in Philosophy.

**10A. Introduction to Pedagogy.**

Associate Professor DRESSLAR.

An investigation into the processes and methods of learning and of teaching from the point of view of psychology.

Lectures, discussions, and readings.

3 hrs., first half-year. M W F, 9.

**16. Selected Topics in the Theory and Practice of Education.**

Lectures and readings. Associate Professor DRESSLAR.

2 hrs., second half-year. Prerequisite: At least Senior standing; Course 5 or 10A.

**School Legislation in California.** [See Jurisprudence 9.]

Professor JONES.

An interpretative and critical study of California school law as a resultant of social and political conditions and forces.

2 hrs., second half-year. M W, 11.

\* Not to be given in 1907-08.

**The Philosophy of Education.** [See Philosophy 9.]

Professor HOWISON.

The nature, aims, instruments, and methods of education, and its right organization in institutions.

2 hrs., throughout the year. S, 10-12.

**FREE ELECTIVE COURSE IN THE UPPER DIVISION.****8. The Practice of Education Among Different Peoples.**

Lectures by members of various departments, *e.g.*, Greek, Latin, History, Anthropology.

1 hr., second half-year. A fuller announcement of this course will be made later.

**GRADUATE COURSE.****1. The Practice of Teaching.** Assistant Professor RUGH.

Lectures, readings, and conferences, together with school observation and practice of teaching, under the direction of the instructor. The school observation and practice of teaching ordinarily require one period daily for five days a week, but students are expected to have two consecutive, free hours between 9 and 3 o'clock throughout the week in order to facilitate making the teaching assignments. Required of all candidates for the Teachers' Recommendation whose pedagogical training is taken at this University.

4 hrs., either half-year. W, 4; S, 9; and a conference hour to be arranged. Prerequisite: I. Education 4 or 25; II. Education 5B or 10A or 21; and III. Education 18A or 22A or 26. But the courses elected under II and III may be taken in conjunction with this course.

**2A. School Supervision.** Associate Professor DRESSLAR.

Seminar for the study of problems in the organization, grading, and management of schools; intended especially for those who are preparing to become school principals or superintendents.

2 hrs., first half-year. S, 8-10. Admission only on consultation with the instructor in charge.

**7. Educational Seminar.** Professor LANGE.

Topics changed from year to year. Subject for 1907-08: Sociological Tendencies in Education. Admission only on consultation with the instructor in charge.

2 hrs., second half-year. S, 10-12.

**11A. Seminar for the Study of Children.**

Associate Professor DRESSLAR.

2 hrs., first half-year. Th, 3-5. Admission only on consultation with the instructor in charge.

**11B. Seminar for the Study of Children.**

Associate Professor DRESSLAR.

2 hrs., second half-year. Th, 3-5. Admission only on consultation with the instructor in charge. 11B may be elected in addition to 11A without repetition of subject-matter.

**12. School Hygiene.**

Associate Professor DRESSLAR.

Lectures and readings.

2 hrs., second half-year. Tu Th, 8. Prerequisite: Course 2 in Philosophy.

**15. Special Studies.**

Professor LANGE.

Associate Professor DRESSLAR and Assistant Professors THOMAS and RUGH.

Credit value, hours, and topics to be arranged with individual students.

**18A. Language and Literature in Secondary Schools.**

Professor LANGE.

Language and literature as educational means; principles, material, and methods of instruction; the arts of interpretation and translation; practical exercises, oral and written.

3 hrs., second half-year. M W F, 8.

**\*18B. English in Secondary Schools.**

Professor LANGE.

The teaching of English in the light of educational aims; organization of the curriculum; problems in correlation; methods of teaching grammar, oral and written expression, and literature; illustrations of class exercises.

3 hrs., first half-year. M W F, 8.

**21. The High School.**

Assistant Professor THOMAS.

Primarily a study of the concrete problems of the high school, with particular reference to questions of curriculum, instruction, and management. Lectures, readings, discussions, and reports.

3 hrs., first half-year. M W F, 4.

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\* Not to be given in 1907-08.



**22A. The Art of Class Teaching.**

Mr. HEATON.

A study of class teaching. Topics: General method; the specific value, aim, and method of each of the several subjects taught in elementary schools. Intended for school principals and class teachers. Lectures and readings.

2 hrs., first half-year. S, 10-12.

**22B. The Grammar School Principal.**

Mr. HEATON.

A study of the functions of the principal as administrator. Topics: Organization, discipline, grading, promotion, individual teaching, ungraded room, departmental work, incentives, social activities of the school. Intended especially for principals and teachers in active service and for those preparing to become principals of public grammar schools. Lectures and readings.

2 hrs., second half-year. S, 10-12. Admission only on consultation with the instructor in charge.

**26. Introduction to Educational Method.**

Assistant Professor RUGH.

The school subjects, their nature and subdivisions into lessons; the nature, place, and assignment of the lesson; the recitation.

Lectures, readings, lesson plans, and school observation.

2 hrs., either half-year. Tu, 4; S, 8.

**27. Moral Training.**

Assistant Professor RUGH.

A study of the child as a social being. Instincts, impulses, and the development of notions and standards of conduct; authority and obedience; moral motives for school work; the school exercises and school subjects as means of moral training; rewards and punishment; ethical freedom in school.

2 hrs., second half-year. Tu Th, 8.

**JURISPRUDENCE.**

WILLIAM CAREY JONES, M.A., Professor of Jurisprudence.

GEORGE H. BOKE, M.A., LL.B., Professor of Jurisprudence.

ORRIN K. McMURRAY, Ph.B., LL.B., Professor of Jurisprudence.

CURTIS H. LINDLEY, Honorary Professor of the Law of Mines and Water.

ALEXANDER M. KIDD, A.B., LL.B., Instructor in Law.

\*WARREN OLNEY, Jr., A.B., LL.B., Lecturer in Law.

LESTER H. JACOBS, Ph.B., LL.B., Lecturer on the Law of Insurance.

HENRY W. BALLANTINE, A.B., LL.B., Lecturer in Law.

MAX THELEN, B.L., Lecturer in Law.

Besides theoretical and historical courses in law, this department aims to give a thorough legal training. A three years' professional curriculum is organized, leading to the degree of Doctor of Law (*Juris Doctor*). Only graduates or students who have had three years of college work are admitted as regular students, candidates for this degree. The first year of this curriculum may be taken as the fourth year of undergraduate work, enabling the student to obtain both the academic degree and the legal degree in six years. A dissertation on some legal question will be required of candidates for the degree of Doctor of Law (J.D.).

**LIBRARY.**

A valuable Law Library is accessible to the students. It contains the Federal reports, the more important older State reports, all the recent State reports, and a large number of text-books, works of reference, and legal periodicals, American and foreign. It contains the more important English reports, of which it will soon have complete sets.

**PRACTICE WORK AND MOOT COURTS.**

Attention will be given, in connection with the courses in Procedure and Practice, to the subjects of brief-making and legal forms.

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\* Absent on leave, 1907-08.

The students have organized a Law Club for the primary purpose of holding Moot Courts. These courts are aided with the advice and direction of members of the Faculty.

#### LOWER DIVISION COURSES.

10. **Elementary Law and Jurisprudence.** Mr. BALLANTINE.  
The general principles of the law. Designed for students of the Colleges of Letters, Social Sciences, and Commerce.  
2 hrs., throughout the year. Tu Th, 8.
18. **Commercial Law.** Mr. KIDD.  
2 hrs., throughout the year. Tu Th, 9. Designed especially for students in the College of Commerce.

#### UPPER DIVISION COURSES.

3. **Principles of International Law.** Mr. THELEN.  
2 hrs., throughout the year. Tu Th, 8.
1. **Formation of the Federal Constitution.** Professor JONES.  
An investigation by each student individually, under the direction of the instructor, of the sources of the Constitution.  
1 hr., either half-year. Consultation hour: F, 8 or 10.
5. **Roman Law.** Professor JONES.  
A systematic and historical exposition of the principles of Roman law, with free use of the material in the Institutes and Digest. Special attention is given to the subjects of property, contracts, and delicts.  
2 hrs., throughout the year. Tu Th, 10. Required for the Group Elective in Jurisprudence; but students may take instead the two courses given in the Department of Latin, namely, Courses 21 and 81.
- Elementary Roman Law.** [See Latin 21.] Professor MERRILL.  
The Institutes of Justinian.  
2 hrs., first half-year. M W, 10.
- Select Titles from the Digest.** [See Latin 81.] Professor MERRILL.  
Books 18, 19, 20, 21, and 13.7, being part of the law of contracts.  
1 hr., second half-year. F, 11; 3 units.

**9. School Legislation in California.**

Professor JONES.

An interpretative and critical study of California school law as a resultant of social and political conditions and forces.

2 hrs., second half-year. M W, 11. This course is also listed in the Department of Education.

**THE PROFESSIONAL CURRICULUM.***First Year.***11. The Law of Property.** (First year.) Professor McMURRAY.

Rights in personal property; possession; acquisition of rights; transfer of rights. Introduction of the Law of Real Property; tenure; seisin; estates; the Statute of Uses; the form, execution, and delivery of conveyances; estoppel; leases, incidents of ownership in real property; *jura in solo alieno*; adverse possession and prescription.

3 hrs., throughout the year. M W F, 9.

**12. The Law of Torts.**

Professor JONES.

Trespass to person, to real property and to personal property; excuses for trespass; conversion; legal cause; negligence; contributory and imputed negligence; plaintiff's illegal conduct as a defense; duties of landowners; hazardous occupations; liability for animals; deceit; defamation: slander, libel, privilege, malice; malicious prosecution, criminal and civil; interference with social and business relations; inducing breaches of duty, fair and unfair competition, strikes, boycotts, business combinations.

2 hrs., throughout the year. Tu Th, 9.

**13. Criminal Law and Procedure.**

Mr. KIDD.

The sources of the criminal law; criminal procedure; general analysis of the criminal act and of the criminal intent; conditions of criminal responsibility; parties and jurisdiction; the analysis of particular crimes, including crimes against the person, larceny and kindred crimes (with particular emphasis on the doctrine of possession under the English law), crimes against the dwelling-house, and conspiracy.

2 hrs., throughout the year. Tu Th, 11.

**15. The Law of Contracts.**

Professor BOKE.

An investigation and application of the principles of such important phases of contracts as: the doctrine of mutual assent,

and its questions of acceptance and revocation of offer; the doctrine of consideration, its historical development and modern aspect; requisites of contracts under seal; rights of parties under the contract, including assignee of a contract, third person beneficiary under a contract, and joint obligors; contracts under the Statute of Frauds; performance of contracts,—conditions, express and implied; impossibility; illegal contracts; contracts in restraint of trade.

4 hrs., throughout the year. M W F, 8.

**19. Common Law Procedure.**

Mr. KIDD.

A study of the common-law system of procedure as it existed at the most favorable time for its investigation, *viz.*, from the adoption of the Hilary Rules, in 1834, to the adoption of the Common Law Procedure Act in 1852. Designed to serve as an introduction to the general subject of Procedure.

2 hrs., first half-year. Tu Th, 10.

## GRADUATE COURSES.

### THE PROFESSIONAL CURRICULUM.

#### *Second and Third Years.*

**17. The Law of Property.** (Second year.) [1908-09.]

Professor McMURRAY.

Descent and succession; gifts *mortis causa*; wills; probate and administration; legacies: conditional and future interests; the rule against perpetuities; restraints on alienation; priorities and recording statutes; joint ownership; homestead.

3 hrs., throughout the year. M W F, 10.

**20. Agency.** [1908-09.]

Professor McMURRAY.

The creation and termination of the relation; nature and execution of the authority; rights and liabilities under the relation; particular classes of agents.

2 hrs., first half-year. Tu Th, 10.

**30. Negotiable Instruments.** [1907-08.] Professor McMURRAY.

The fundamental principles of the law of commercial paper in the Anglo-American system.

2 hrs., throughout the year. M W, 10.

**21. The Law of Evidence. [1908-09.]**

Mr. OLNEY.

The nature of evidence; the jury; judicial notice; burden of proof; presumptions; admissions; law and fact; rules of exclusion; opinion evidence; real evidence; writings; competency, privilege, and examination of witnesses.

2 hrs., throughout the year. S, 8-10.

**27. The Law of Trusts. [1907-08.]**

Professor BOKE.

Nature and requisites of a trust; language necessary to create a trust, consideration, subject-matter, the *cestui que trust*, the trustee; nature of *cestui que trust's* interest; transfer of trust property, by act of the party, by death, by forfeiture, by marriage, by bankruptcy, by act of the creditors; extinguishment of a trust; duties of a trustee.

2 hrs., throughout the year. Tu Th, 11.

**22. The Principles of Equity. [1908-09.]**

Professor BOKE.

The nature of equity jurisdiction: specific performance of contracts, including such aspects as extent of the jurisdiction from the subject-matter of the contract, relief for and against third persons, legal consequences of the right of specific performance, consideration, the Statute of Frauds—part performance, fraud, misrepresentation, concealment, mistake, hardship, and mutuality of relief; bills for an account; specific reparation and prevention of torts, waste, trespass, disturbance of easements, nuisance, and miscellaneous exclusive franchises.

2 hrs., throughout the year. Tu Th, 11.

**24. The Law of Sales. [1908-09.]**

Professor JONES.

Subject-matter of sale; executory and executed sales; bills of lading and *jus disponendi*; stoppage in transitu; fraud; factors' acts; warranty; Statute of Frauds.

3 hrs., first half-year. Tu Th F, 8.

**26. The Law of Public Service Companies and Carriers. [1908-09.]**

Professor JONES.

Nature of public calling; railroads and canals; telegraph and telephone; light and water companies; irrigation and drainage; inns and warehouses. Common carriers of goods and passengers; connecting carriers; actions against carriers; tickets; baggage; compensation and lien.

3 hrs., second half-year. Tu Th F, 8.

**25. The Law of Corporations.** [1907-08.]

Professor BOKE.

Private Corporations: Legal conception of a corporation; creation of the corporation; corporations *de facto*; implied powers of corporations; directors; rights of stockholders; liability of corporation for torts; for crimes and contempts; *ultra vires* transactions; rights and remedies of creditors; forfeiture of charter on *quo warranto*; powers of a corporation; trusts; the charter as a contract; modes of dissolution; foreign corporations. Municipal Corporations: legislative control; rights and remedies of creditors; liability for torts; implied power to contract on credit, borrow money, and issue negotiable paper; express restrictions of the power of incurring indebtedness.

2 hrs., throughout the year. M W, 9.

**38. Suretyship and Mortgage.** [1908-09.]

Professor BOKE.

Suretyship: Nature of the contract of suretyship; the surety's defenses against creditors; the rights of the surety; the creditor's rights to the sureties' securities.

Mortgage: the form of the mortgage,—legal and equitable; the substance of the mortgage; the elements of the mortgage; the position of the mortgagee; the situation of the mortgagor; assignment of the mortgage; marshaling; priority.

2 hrs., throughout the year. M W, 9.

**16. The Law of Mines and Water.** [1907-08.]

Professor LINDLEY.

1 hr., throughout the year. Tu, 4.

**32. The Law of Insurance.** [1907-08.]

Mr. JACOBS.

1 hr., throughout the year. F, 4.

**2. Constitutional Law.** [1907-08.]

Professor JONES.

Constitutional Law of the United States, both State and Federal. Written constitutions: making, revision, and amendment; separation of powers; Federal jurisdiction; citizenship; fundamental civil and political rights; the later amendments to the Federal Constitution; unclassified legislative power; the police power; eminent domain; taxation; *ex post facto* and retroactive laws; obligation of contracts; regulation of commerce; money.

This course will be open as a free elective to Upper Division students who do not intend to take the professional curriculum in Law.

3 hrs., first half-year, Tu Th F, 8; 2 hrs., second year, Tu Th, 8.

**29. Code Procedure.** [1907-08.]

Professor MCMURRAY.

Analysis and development of the fundamental notions underlying the American Reformed System of Civil Procedure, and comparison of that system with other systems of civil procedure; the proceedings in connection with an action from the selection of the tribunal to the final judgment. Particular attention is given to the system as illustrated and developed in the Western States of America.

3 hrs., first half-year, Tu Th, 9; F, 10; 2 hrs., second half-year, Tu Th, 9.

**33. Practice.** [1907-08.]

Mr. KIDD.

In connection with this course students are expected to draft ordinary legal documents, such as deeds, mortgages, leases, articles of incorporation, partnership agreements, and papers required in the successive stages of an action or special proceeding. Attention will be given to the examination of authorities and the preparation of briefs.

2 hrs., second half-year. Tu Th, 10.

NOTE.—Students planning to take the law courses in their Senior year should have all other college work completed by the end of their Junior year.

Students in the College of Commerce who desire to take more than Courses 10, 18, and 3 should consult the head of the department.

Roman Law is prerequisite to all courses except 10, 3, and 18, and should be taken in the Junior year.

Graduate standing implies that the student has credit for Courses 5, 11, 12, 13, 15, 19.

Latin 21 and 81 may be included in the Advanced Work in Jurisprudence.

Mid-year Examinations will not be held in Courses 11, 12, 13, and 15, or in the Graduate year-courses.



**HISTORY.**

BERNARD MOSES, Ph.D., LL.D., Professor of History and Political Science.

THOMAS R. BACON, A.B., B.D., Professor of Modern European History.

H. MORSE STEPHENS, M.A., Professor of History and Director of University Extension.

WILLIAM S. FERGUSON, Ph.D., Associate Professor of Greek and Roman History.

JACOB N. BOWMAN, Ph.D., Assistant Professor of Medieval History.

EUGENE I. MCCORMAC, Ph.D., Instructor in American History.

DON E. SMITH, A.B., Lecturer in University Extension and Teaching Fellow in History.

JAMES R. ROBERTSON, A.B., M.A., Teaching Fellow in History.

RAYNER W. KELSEY, Ph.B., Teaching Fellow in History.

JAMES W. MORIN, B.L., Reader in American History.

ARTHUR H. BRANDT, B.L., Reader in Medieval History.

1. The general prerequisites to all courses in the Upper Division, excepting such as are designated as free elective courses, are any two of the following three: History 52, 64, and Political Science 1A and 1B.

2. The Department of History will recommend for the high school teacher's certificate only such students as have completed a course (6 units) in Ancient History, English History, Medieval History, Modern European History, and American History; and have passed a final examination upon the general content, sources of knowledge, and bibliography of the various history subjects taught in the high schools.

The examination of candidates for the teacher's certificate will begin in December, 1906.

It should be observed that a reading knowledge of French or German is necessary for some Upper Division courses in the Department of History.

### LOWER DIVISION COURSES.

The work in History and Political Science prescribed in the various colleges of the University must be taken from the first three Lower Division courses. The work in the Lower Division courses consists not only in attendance upon lectures and in prescribed reading, but, in addition, the classes are organized into sections in which recitations, examinations, and conferences are conducted by the Teaching Fellows in History.

#### 52. **History of England.**

Professor STEPHENS.

Lectures on the political and constitutional history of England, with the study of the documents contained in Adams' and Stephens' *Select Documents of English Constitutional History*.

3 hrs., throughout the year. M Tu W, 2. See 52A.

#### 64. **History of the Middle Ages.** Assistant Professor BOWMAN.

A general survey of the history of Western Europe to the end of the Reformation movement.

3 hrs., throughout the year. M W F, 1. See 64A.

#### **Government.** [See Political Science 1A and 1B.]

Assistant Professor ROBERTS.

### FREE ELECTIVE COURSES IN THE LOWER DIVISION.

The following courses, unless otherwise specified, are open to all students in the University, but they will not be counted as prescribed work. They may be counted, under conditions of additional work prescribed by the instructor, as Upper Division courses.

#### 55. **Latin-American History and Institutions.** Professor MOSES.

Spanish and Portuguese settlement and administration during the Colonial Period; the War of Independence; the political development of the Latin-American Republics.

3 hrs., second half-year. M W F, 2.

#### 56A. **The French Revolution: The History of Europe from 1789 to 1800.**

Professor BACON.

3 hrs., first half-year. M W F, 10. Prerequisite: Any 6 units of History

**56B. The French Revolution: The History of Europe from 1800 to 1815.**

Professor BACON.

3 hrs., second half-year. M W F, 10. Prerequisite: Course 56A.

**Principles of Economics.** [See Economics 2.] Professor MILLER.

UPPER DIVISION COURSES.

Students who choose to take their Major Subject in History must select exclusively from courses listed below.

**52A. History of England.**

Professor STEPHENS.

In addition to attending the lectures in Course 52, the documents contained in Stubbs' Select Charters, Prothero's Statutes and Constitutional Documents, and Gardiner's Constitutional Documents of the Puritan Revolution are studied in a special section. A reading knowledge of Medieval Latin is required.

M Tu W, 2.

**53. Athenian Democracy.**

Associate Professor FERGUSON.

An outline of the history of Athens and a close examination of its politics, government, and culture during the ages of Pericles and Demosthenes. Alternates with 53B. Given in 1907-08. Not more than thirty students will be enrolled.

3 hrs., first half-year. M W F, 1.

**\*53B. Greek Imperialism.**

Associate Professor FERGUSON.

The expansion of Greece under Macedonian leadership. Macedonia, Greece, Syria, and Egypt during the third century B.C. Hellenistic culture and institutions. Alternates with 53. Given in 1908-09. Not more than thirty students will be enrolled.

3 hrs., first half-year. M W F, 1.

**53C. The Beginnings of Greek History.**

Associate Professor FERGUSON.

The Mycenaean world. Homer and Homeric society. The transition from the Greek Middle Ages to classic Greece. The Spartan state. Alternates with 54C. Given in 1907-08.

2 hrs., first half-year. Tu Th, 1.

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\* Not to be given in 1907-08.

**54A. Revolutionary Rome.**

Associate Professor FERGUSON.

A brief sketch of the Roman conquest of the Mediterranean world. The reaction of the empire upon the republic. A study, with source readings, of the growth of Caesarism. Given every year. Not more than thirty students will be enrolled.

3 hrs., first half-year. M W F, 2.

**54B. The Roman Principate.**

Associate Professor FERGUSON.

The Augustan restoration. Constitutional monarchy vs. absolutism. Central and local administration of the empire. The collapse of the principate and the decline of the ancient culture. Given every year. Not more than thirty students will be enrolled.

3 hrs., second half-year. M W F, 2.

**\*54C. Early Italian History.**

Associate Professor FERGUSON.

The discovery of Italy. The Etruscan hegemony. Roman origins. The conquest and organization of the peninsula. The Italian confederacy. Alternates with 53C. Given in 1908-09.

2 hrs., first half-year. Tu Th, 1.

**54D. The Later Roman Empire.**

Associate Professor FERGUSON.

A study of Roman life and institutions from the reorganization of the state by Diocletian to the time of Justinian. Alternates with 54E. Given in 1907-08.

2 hrs., second half-year. Tu Th, 1.

**\*54E. Byzantine History.**

Associate Professor FERGUSON.

The political history of the Byzantine Empire. Alternates with 54D. Given in 1908-09.

2 hrs., second half-year. Tu Th, 1.

**\*57. Europe in the Nineteenth Century.**

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3 hrs., second half-year. Tu Th S, 9.

**\*59. Constitutional History of England to 1485.**

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A detailed study of the origin and growth of the constitution and the principles of public law in England.

3 hrs., throughout the year. Prerequisite: Course 52.

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\* Not to be given in 1907-08.

**\*60. Constitutional History of England since 1485.**

Professor STEPHENS.

A detailed study of the development of constitutional government in England from the end of the Middle Ages to the present time.

3 hrs., throughout the year. M W F, 2. Prerequisite: Course 59.

**\*62A. Constitutional History of Rome.**

Associate Professor FERGUSON.

The growth of Roman institutions and a systematic exposition of Roman public law. Given in 1908-09 and thereafter in every second year.

2 hrs., second half-year. Tu Th, 2. Prerequisite: Course 54A and 54B or 54C and 54D.

**63. Modern European History.**

Professor STEPHENS and Mr. DON E. SMITH.

Lectures on the History of Europe from 1600 to 1890, based on Stephens' Syllabus of a Course of Lectures on European History.

3 hrs., throughout the year. M Tu W, 1. Prerequisite: Course 52, and Course 64, and a reading knowledge of French or German.

**63A. Historical Geography of Modern Europe.** Mr. DON E. SMITH.

A study of the map of Europe by treaty, and of the geographical development of modern European States.

2 hrs., throughout the year. Th F, 1.

**64A. History of the Middle Ages.** Assistant Professor BOWMAN.

Special work and conference in addition to the lectures of Course 64.

3 hrs., throughout the year. M W F, 1.

**70. American History from the Discovery to 1850.**

Dr. MCCORMAC.

A brief review of the period of explorations; a detailed study of colonial institutions; the formation of the Constitution; and the political and social development of the United States.

3 hrs., throughout the year. M W F, 9.

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\* Not to be given in 1907-08.

**71. History of the United States since 1850.** Dr. McCORMAC.

A detailed study of the Civil War and the Reconstruction period, and the important features of recent history.

3 hrs., second half-year. M W F, 10. Prerequisite: Course 70.

**80A. The Change from Ancient to Medieval History.**

Professor BACON.

This is the course which has hitherto been given under the title, *Institutional History*. It is a study of the transition from ancient to medieval civilization, especially with reference to the change in political, social, and economic conditions. The basis of the work is Gibbon's *Decline and Fall of the Roman Empire*.

2 hrs., first half-year. Tu Th, 9. Prerequisite: 20 units of History. (Six units of Economics or Political Science, or three units of Geography, may be substituted for a corresponding number of units in History.)

**86. Diplomatic History of the United States.** Dr. McCORMAC.

History of the foreign relations of the United States from the beginning of the Revolution to the close of the Civil War. Special attention is given to the commercial treaties following the Revolution, to annexations of territory, to the relations with Spanish America, and the period of the Civil War.

3 hrs., first half-year. M W F, 10. Prerequisite: Course 70.

**87A. The Renaissance and Reformation: The Renaissance. The Transition from Medieval to Modern History.**

Professor BACON.

3 hrs., first half-year. M W F, 9. Prerequisite: 20 units of History. (Six units of Political Science or Economics may be substituted for a corresponding number of units in History.)

**87B. The Renaissance and Reformation: The Protestant Reformation and the Catholic Reaction.** Professor BACON.

The religious and ecclesiastical aspect of the transition from medieval to modern history.

3 hrs., second half-year. M W F, 9. Prerequisite: Course 87A.

**95A. The Holy Roman Empire.** Assistant Professor BOWMAN.

A study of the Holy Roman Empire during the Middle Ages.

3 hrs., first half-year. M W F, 10.

**95B. The Papacy during the Middle Ages.**

Assistant Professor BOWMAN.

3 hrs., second half-year. M W F, 10.

**\*95C. The Early Germans.**

Assistant Professor BOWMAN.

The wandering of the nations, and the German kingdoms to the ninth century.

3 hrs., first half-year. M W F, 10.

**\*95D. Civilization during the Middle Ages.**

Assistant Professor BOWMAN.

3 hrs., second half-year. M W F, 10.

**\*95E. Germany during the Middle Ages.**

Assistant Professor BOWMAN.

A general survey of the history of Germany to the abdication of Charles V.

3 hrs., first half-year. M W F, 10.

**\*95F. France during the Middle Ages.**

Assistant Professor BOWMAN.

A general survey of the history of France to the death of Francis I.

3 hrs., second half-year. M W F, 10.

**FREE ELECTIVE COURSES IN THE UPPER DIVISION.**

The following courses are open to all students in the Upper Division. They should be entered in preference to Lower Division Courses in History by Juniors and Seniors whose Major Subject lies in other departments. They will be counted neither as prescribed nor as advanced work.

**111. Outline of Spanish History.**

Professor BACON.

2 hrs., second half-year. Tu Th, 9.

**113. Ancient Culture.**

Associate Professor FERGUSON.

A series of illustrated lectures upon topics chosen to mark the development of culture in antiquity and to bring into prominence the contributions of Greece and Rome to modern civilization. Not to be counted as part of the Ancient History requirement for the teacher's certificate. Given in 1907-08 and thereafter in every second year.

2 hrs., throughout the year. Tu Th, 2.

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\* Not to be given in 1907-08.

## GRADUATE COURSES.

**92. Investigation Course in the History of the United States.**

Dr. MCCORMAC.

A course in original research upon assigned topics, with class reports and criticisms.

2 hrs., throughout the year. Hour to be arranged.

**\*93. History of the Christian Church.**

Professor BACON.

The spread of Christianity, and the doctrine and polity of the Church.

2 hrs., throughout the year. Tu Th, 10.

**94. History of Eastern Christendom.**

Professor BACON.

A critical study of the political, social, and religious institutions of the Eastern Christian nations.

2 hrs., throughout the year. Th, 2-4.

**104. The Teaching of History.**

Professor STEPHENS.

A discussion of the teaching of history in secondary schools, with special emphasis on the methods and materials. The course is designed for graduates expecting to apply for a high school teacher's certificate in history.

2 hrs., either half-year. Tu, 3. Prerequisite: Courses 52, 54A-E (six units), 64, 63, and 70, and Political Science 1.

**107. Seminary in Ancient History.**

Associate Professor FERGUSON.

This is intended for the prosecution of specialized work in problems of Greek and Roman history. A subject is assigned to each member for investigation in regard to which periodic reports and a final statement of results are expected. Admission to the seminary rests with the instructor.

During 1907-08 subjects are assigned from the Age of Augustus.

2 hrs., throughout the year. Th, 3-5.

**108. Pro-Seminary in History: A Seminary in Historical Method.**

Professor STEPHENS.

Also open to Seniors with the consent of the instructor. Prerequisite: Courses 63, 64.

2 hrs., throughout the year. M, 3-5.

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\* Not to be given in 1907-08.



**108A. Seminary in Medieval History.**

Assistant Professor BOWMAN.

Also open to Seniors with the consent of the instructor.

2 hrs., throughout the year. F, 3-5.

**108B. Seminary in Modern European History.**

Professor STEPHENS.

Open to graduate students. Prerequisite: Course 108.

2 hrs., throughout the year. W, 3-5.

**\*Seminary in Government.** [See Political Science 11.]

Assistant Professor ROBERTS.

**COURSES IN OTHER DEPARTMENTS.**

**The History of the People, Language, and Literature of China.**

[See Oriental Languages 1.]

Professor FRYER.

**History of the Laws, Government, and Social Condition of China.**

[See Oriental Languages 11.]

Professor FRYER.

**The Mohammedan Countries.** [See Semitic 25.]

Assistant Professor POPPER.

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\* Not to be given in 1907-08.

**POLITICAL SCIENCE.**

BERNARD MOSES, Ph.D., LL.D., Professor of History and Political Science.

WILLIAM S. FERGUSON, Ph.D., Associate Professor of Greek and Roman History.

GUY HALL ROBERTS, Ph.D., Assistant Professor of Political Science.

GEORGE R. NOYES, Ph.D., Assistant Professor of Slavic Languages.

The general prerequisites to all courses in the Upper Division are any two of the following three: History 52, 64, and Political Science 1A and 1B.

**LOWER DIVISION COURSES.**

The work in History and Political Science prescribed in the various colleges of the University must be taken from the Lower Division courses.

**1A. Government.**

Assistant Professor ROBERTS.

A description of the institutions and operation of the British and American governments, with a study of political parties and their organization.

3 hrs., first half-year. M W F, 3.

**1B. Government.**

Assistant Professor ROBERTS.

The governments and parties of continental Europe.

3 hrs., second half-year. M W F, 3. Prerequisite: Course 1A.

**UPPER DIVISION COURSES.****2. History of Political Theories.**

Professor MOSES.

The history of political thought to the middle of the eighteenth century, and its influence on institutions.

3 hrs., first half-year. M W F, 2. Prerequisite: Courses 1A and 1B.

**3. Theory of Social Progress.**

Professor MOSES.

A critical examination of the theories hitherto offered to explain the forces, methods, and aims of social progress.

2 hrs., first half-year. Prerequisite: Course 2.

**5. Comparative Constitutional Law.**

A comparative view of the development and present condition of the political institutions of the Western nations.

3 hrs., first half-year. Prerequisite: Three courses in European history.

**6. Greek Institutions.**

Associate Professor FERGUSON.

The origin and working of the mechanism of government in typical oligarchic, democratic, federal, and monarchic states. International relations. The Greek theory of government.

3 hrs., first half-year. M W F, 3. Prerequisite: History 53 and a reading knowledge of French or German.

**7. International Relations.**

Professor MOSES.

Course 1 deals with the organization and operations of government with reference to internal affairs; Course 7, with international relations.

2 hrs., second half-year. Tu Th, 3. Prerequisite: Courses 1A and 1B.

**8. The Government of Dependencies.**

Professor MOSES.

An account of the rise, organization, and administration of political dependencies, excluding the former European Colonies in America.

2 hrs., first half-year. Tu Th, 3. Prerequisite: Courses 1A and 1B.

**9. Russian Politics.**

Assistant Professor NOYES.

A sketch of the development of Russian central and local institutions, with special reference to the present situation in Russia.

3 hrs., second half-year. M W F, 2.

**10. The Government of Municipalities.**

Assistant Professor ROBERTS.

A brief outline of the government of ancient and medieval cities; an account of the growth, causes of growth, and structure of population, of modern municipalities; a study of the governmental organization and activities of German, French, British, and American cities.

3 hrs., throughout the year. M W F, 2. Prerequisite: Courses 1A and 1B, or the consent of the instructor.

**12. Studies in Contemporaneous Politics.**

Assistant Professor ROBERTS.

A discussion of recent and existing problems in government.

2 hrs., throughout the year. Th, 3-5. Prerequisite: Courses 1A and 1B, twelve units of history, and the consent of the instructor.

**GRADUATE COURSES.****4. Political Science.**

Professor MOSES.

A course of graduate study in the science of politics, including the history of political thought since the middle of the eighteenth century.

2 hrs., second half-year.

**\*11. Seminar in Government.**

Assistant Professor ROBERTS.

2 hrs., throughout the year. T, 3-5.

**COURSES IN OTHER DEPARTMENTS.****History of England.** [See History 52.] Professor STEPHENS.

Lectures on the political and constitutional History of England.

**History of the Middle Ages.** [See History 64.]

Assistant Professor BOWMAN.

A general survey of the history of Western Europe to the end of the Reformation movement.

**Constitutional Law.** [See Jurisprudence 2.] Professor JONES.

Constitutional law of the United States, both State and Federal.

The following are courses in Economics, but will be accepted as major courses in Political Science. Economics 9A and 9C are graduate courses; the others here following are Upper Division Courses; but Economics 9 may be counted as Lower Division work.

**9. Introduction to Public Finance.** Associate Professor PLEHN.

The theory and methods of taxation, illustrated by the experience of various nations; the expenditure and administration of public funds; public debts. Especial attention will be paid to taxation in California.

3 hrs., first half-year. M W F, 2. Prerequisite: Economics 2.

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\* Not to be given in 1907-08.

**9A. Taxation.**

Associate Professor PLEHN.

An intensive study of the principles of taxation as illustrated by the practices of different countries.

3 hrs., second half-year. M W F, 3. Prerequisite: Economics 9.

**\*9C. Municipal Finance.**

Associate Professor HATFIELD.

A study of the revenues, expenditures, debt management and fiscal administration of American cities.

2 hrs., first half-year. Tu Th, 11. Prerequisite: Economics 9.

**10. Statistics.**

Associate Professor PLEHN.

The history, theory, and methods of statistics. The collection, analysis, and presentation of statistical data relating to economics and kindred sciences. Practice in the use of mechanical, graphical, and other, devices and apparatus for tabulation, computation, and analysis.

3 hrs., throughout the year, including one laboratory period. Tu Th, 11, and a laboratory period to be arranged. Prerequisite: Economics 2; Mathematics 20A must be taken in conjunction with this course. The class to be limited at the discretion of the instructor.

**31. Consular Service.**

Assistant Professor HUTCHINSON.

A brief history of the consular service, followed by a technical study of the training and duties of consuls and the practice of the leading commercial nations in regard to appointments, etc.

2 hrs., first half-year. The consent of the instructor must be obtained before enrollment.

**42. Contemporary Theories of Social Reform.**

Assistant Professor PEIXOTTO.

A study of current schemes for the partial or total reconstruction of industrial society. The course includes a critical examination of the programmes and principles of the leading reform movements of the day. Particular attention is of course given to contemporary Socialism in its various aspects, but studies are also made of the nature and present status of Anarchism, Communism, Coöperation, Single Tax, and kindred movements.

3 hrs., first half-year. M W F, 3. Prerequisite: Economics 2.

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\* Not to be given in 1907-08.

**43. History of Social Reform Movements.**

Assistant Professor PEIXOTTO.

An historical review of the more important social movements usually roughly grouped as Socialistic. The course aims to sketch the causes, nature, and influences of the more important schemes for social reconstruction which appeared from ancient times up to the Commune of 1871.

3 hrs., second half-year. M W F, 3. Prerequisite: Economics 42.

**ECONOMICS.**

ADOLPH C. MILLER, M.A., Flood Professor of Political Economy and Commerce.

CARL C. PLEHN, Ph.D., Associate Professor of Finance, on the Flood Foundation.

†HENRY RAND HATFIELD, Ph.D., Associate Professor of Accounting, on the Flood Foundation.

WESLEY C. MITCHELL, Ph.D., Assistant Professor of Commerce, on the Flood Foundation.

LINCOLN HUTCHINSON, M.A., Assistant Professor of Commerce.

JESSICA B. PEIXOTTO, Ph.D., Assistant Professor of Sociology.

SIMON LITMAN, Dr.jur., Instructor in Commercial Practice.

ELWOOD MEAD, M.S., C.E., Professor of the Institutions and Practice of Irrigation.

\*ALBERT W. WHITNEY, A.B., Assistant Professor of Mathematics and of Insurance Methods.

ERNEST J. WILCZYNSKI, Ph.D., Associate Professor of Mathematics.

The courses prerequisite to a Major Subject in the Department of Economics are Economics 2 and any one of the following: Economics 1, Political Science 1A and 1B and History 52. No part of the work in the Major Subject is to be undertaken until the prerequisite courses shall have been completed. But students who plan to take less than twelve units of Upper Division work in this department may proceed immediately with the advanced courses for which they have the particular prerequisites.

Students in the College of Commerce will take Course 1 in their Freshman year, and will, ordinarily, take Course 2 in their Sophomore year; they must take both 1 and 2. Students in the other colleges may omit Course 1, but before taking advanced courses they must take Course 2, which counts as prescribed History in the three colleges of general culture. Students in Commerce are required to take Course A each half-year for four years and Course 27 throughout the Senior year.

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† Absent on leave, first half-year, 1907-08.

\* Absent on leave, 1907-08.

## LOWER DIVISION COURSES.

**A. Lectures on Commerce.**

In charge of Associate Professor PLEHN.

A series of lectures on subjects relating to modern business, by men of affairs and members of the staff.

1 hr., throughout the year,  $\frac{1}{2}$  unit each half-year. M, 4. Prescribed each year for all students in the College of Commerce.

**1. Introduction to Economics.**

Professor MILLER and Dr. LITMAN.

A study of the elementary facts and laws of industrial organization as exhibited in the growth of industry and commerce in Europe and America since the middle of the eighteenth century.

3 hrs., throughout the year. M W F, 9. Prescribed for all students in the College of Commerce.

**2. Principles of Economics.**

Professor MILLER,

Associate Professor PLEHN, and Assistant Professor MITCHELL.

A systematic view of the leading principles of economics on the basis of a selected text.

3 hrs., either half-year. First half-year, Sec. 1, M W F, 10; Sec. II, M W F, 1. Second half-year, M W F, 9. Prerequisite: At least Sophomore standing; and, for students in the College of Commerce, ordinarily Course 1.

N.B.—This course is required of all students who intend to take any advanced courses in Economics.

**\*5. Economics of Industry.**

Associate Professor HATFIELD.

An elementary course planned primarily to meet the needs of the students in the engineering colleges.

3 hrs., first half-year. Tu Th S, 8. Students in the three colleges of general culture may count this as either Lower or Upper Division work.

N.B.—This course will not be accepted as fulfilling any prescribed work in the College of Commerce.

\* Not to be given in 1907-08. But students in the engineering colleges will be admitted to any of the sections of Course 2.



**3A. Introduction to Economic Geography.**

Assistant Professor HUTCHINSON.

A study of the relations between geography and economics; the phenomena of mathematical, physical, and bio-geography and their connections with economic development.

2 hrs., second half-year. Tu Th, 2. Prerequisite: Geography 7.

**\*3B. The Materials of Commerce.**

Assistant Professor HUTCHINSON.

The geographical distribution of useful animal, vegetable, and mineral products; influence of climate, soil, and other physical conditions; "zones" of vegetation and cultivation, faunal "zones," etc.; geographical factors determining the location of manufactures and mining industries.

2 hrs., first half-year. Tu Th, 10. Prerequisite: Course 3A.

**3C. Economic Geography of the United States.**

Assistant Professor HUTCHINSON.

Special attention is given to California and the other Pacific Coast States.

2 hrs., second half-year. Tu Th, 11. Prerequisite: Courses 3A and 3B, or their equivalent.

**\*4A. Geography of International Trade.**

Assistant Professor HUTCHINSON.

Demand and supply in the world markets; exports and imports of the leading countries; sea-ports; commercial and industrial centers; highways of trade; postal and telegraphic communication, etc.

2 hrs., first half-year. Tu Th, 10. Prerequisite: Course 3A and 3B, or their equivalent.

**8. Theory and History of Banking.**

Assistant Professor MITCHELL.

A study of banking from the standpoint of its relations to the economic development of society. The functions performed by banks; the development of banking systems; the relations between banking operations and price-fluctuations, etc.

3 hrs., second half-year. M W F, 8. Prerequisite: Course 2.

**\*11A. Insurance.**

Assistant Professor WHITNEY.

An elementary course in the principles and practice of insurance. Mathematical treatment will be avoided, except where it is absolutely necessary for clearness.

3 hrs., first half-year. M W F, 9.

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\* Not to be given in 1907-08.

**14. Introduction to Accounting.**

Assistant Professor HUTCHINSON.

The interpretation of accounts with regard to the needs of the business manager rather than those of the accountant. The formation and meaning of the balance sheet. The profit and loss statement.

3 hrs., first half-year, including one laboratory period. M W F,

9. Prerequisite: At least Sophomore standing.

**UPPER DIVISION COURSES.****\*6. History and Theory of International Trade.**

Assistant Professor HUTCHINSON.

A survey of the chief events and factors in the commercial development of Europe and the United States, followed by a discussion of the principles of the theory of international trade.

3 hrs., second half-year. Tu Th S, 10. Prerequisite: Course 3 and one course in English History.

**6B. History of Tariff Legislation in the United States.**

Associate Professor PLEHN.

3 hrs., second half-year. M W F, 1. Prerequisite: Course 1 or 2.

**7. Modern Industrialism.**

Professor MILLER.

A descriptive and interpretative account of the rise of the modern industrial system, especially as affected by the Industrial Revolution. The workings of competition in the nineteenth century and the recent tendency toward the formation of industrial monopolies will receive particular attention.

3 hrs., second half-year. M W F, 10. Prerequisite: Course 2. Class to be limited at the discretion of the instructor.

**8A. Practical Banking.**

Associate Professor HATFIELD.

Consideration of the bank as a business institution; the relation between the bank and the depositor; the extension of credit; the internal organization and administration of the modern bank.

2 hrs., second half-year. Tu Th, 10. Prerequisite: Course 8.

**8B. Money.**

Assistant Professor MITCHELL.

A study of the economic problems centering around the monetary system.

3 hrs., first half-year. M W F, 8. Prerequisite: Course 8.

\* Not to be given in 1907-08.

**\*8c. Foreign Exchange.**

Assistant Professor MITCHELL.

Methods of making international payments; bills of exchange, arbitrage, bank drafts, cable orders, shipment of specie, etc.

2 hrs., second half-year. Tu Th, 9. Prerequisite: Course 8.

**9. Introduction to Public Finance.** Associate Professor PLEHN.

The theory and methods of taxation, illustrated by the experience of various nations; the expenditure and administration of public funds; public debts. Special attention will be paid to taxation in California.

3 hrs., first half-year. M W F, 2. Prerequisite: Course 2. This course may be counted as Lower Division work.

**20A. Theory of Probabilities: Elementary Course.**

Assistant Professor WILCZYNSKI.

2 hrs., first half-year. Tu Th, 9. This course is prerequisite to Courses 10 and 11b.

**10. Statistics.**

Associate Professor PLEHN.

The history, theory, and methods of statistics. The collection, analysis, and presentation of statistical data relating to economics and kindred sciences. Practice in the use of mechanical, graphical, and other devices, and apparatus for tabulation, computation, and analysis.

3 hrs., throughout the year, including one laboratory period. Tu Th, 11; and a laboratory period to be arranged. Prerequisite: Course 2, and at least Junior standing. Mathematics 20A must be taken in conjunction with this course. Class to be limited at the discretion of the instructor.

**\*11b. Actuarial Science.**

Assistant Professor WHITNEY.

The mathematical basis of insurance. The theory of compound interest and annuities, construction of mortality tables, use of empirical formulae, calculation of premiums, reserves, and surplus.

3 hrs., second half-year. M W F, 1. Prerequisite: Economics 2, 11A, and 20A, and at least Mathematics 3c, or its equivalent.

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\* Not to be given in 1907-08.

**\*11C. Advanced Actuarial Science.** Assistant Professor WHITNEY.

An advanced course in actuarial theory and computing.

3 hrs., first half-year. Prerequisite: Courses 10 and 11B.

N.B.—Students who wish to prepare themselves for actuarial work should consult with the instructor concerning the best choice of their mathematical courses.

**12A. History of Economic Thought.**

Assistant Professor MITCHELL.

A critical review of the leading systems of economic thought since the sixteenth century.

2 hrs., first half-year. Tu Th, 9. Prerequisite: Course 2, and at least Junior standing.

**13A. Problems of Labor.**

Assistant Professor MITCHELL.

The position of wage-earners in the economic organization of to-day.

3 hrs., first half-year. M W F, 9. Prerequisite: Course 2, and at least Junior standing.

**\*14A. The Investment Market.**

Associate Professor HATFIELD.

Investment securities, the various classes of stocks and bonds, the construction and use of bond tables, the course of prices in the investment market.

2 hrs., first half-year. Tu Th, 10. Prerequisite: Course 2, and at least Senior standing.

**14B. Advanced Accounting.**

Associate Professor HATFIELD.

A consideration of the more complicated problems of accounting.

3 hrs., second half-year, including one laboratory period. Tu Th, 9; and a laboratory period to be arranged. Prerequisite: Course 14, or its equivalent.

**14C. Corporation Finance.**

Associate Professor HATFIELD.

A study of the organization and financial policy of large corporations. Especial attention given to the subject of industrial corporations and the organization of so-called "trusts."

2 hrs., second half-year. Tu Th, 8. Prerequisite: Course 2, and at least Junior standing.

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\* Not to be given in 1907-08.

†15. **Financial History of the United States.** Professor MILLER.

A detailed study of the legislation and experience of the United States touching currency, banking, debt, taxation, expenditure, etc. The work will be based, as far as possible, on first-hand examination of sources.

2 hrs., first half-year. Tu Th, 2. Prerequisite: Course 2, and at least Junior standing.

16A. **Railway Economics.** Associate Professor PLEHN.

An examination of the chief financial and economic questions which arise in railway organization and management, embracing such topics as capitalization, speculation, and accounting, rate-making, competition, pooling, consolidation, etc.

3 hrs., second half-year. M W F, 2. Prerequisite: Course 2, and at least Junior standing.

†16B. **Railway Finance.** Associate Professor PLEHN.

An advanced study of railway rates and finance.

3 hrs., first half-year. M W F, 1. Prerequisite: Courses 14C and 16A.

Class to be limited at the direction of the instructor.

\*23. **Modern Industrial Processes.** Dr. LITMAN.

The development and present condition of leading modern industries, with particular reference to such industries as now exist or may be established on the Pacific Coast; emphasis will be laid on the technical processes.

3 hrs., first half-year. M W F, 10. Prerequisite: Course 1 or 2.

24. **Mechanism and Technique of Trade.** Dr. LITMAN.

Devices used by governments and individuals to promote commerce; exposition of the work performed by Boards of Trade, Commercial Museums, Mercantile Agencies, of transactions on Produce and Stock Exchanges, of modern wholesale and retail trade organizations. The course will include the reading by the student of mercantile publications, such as consular reports, trade and financial journals, etc.

3 hrs., first half-year. M W F, 8. Prerequisite: Course 1 or 2.

† Given every other year. Not to be given in 1907-08.

\* Not to be given in 1907-08.

**\*24A. Business Forms and Practice.**

Dr. LITMAN.

Detailed study of methods and forms used in connection with the purchase, sale and forwarding of goods; calculations necessitated by the various systems of weights, measures, and moneys in different countries; the significance of price quotations in different markets; the meaning and determination of standards and grades as to quality; the forms and functions of invoices, bills of lading, warehouse receipts, consular certificates, and other business documents relating to trade.

3 hrs., second half-year. M W F, 8. Prerequisite: Course 1 or 2.

**\*25. Economic Crises and Depressions.**

Assistant Professor MITCHELL.

A study of recurrent fluctuations of business activity. Periods of active speculation, panic, liquidation, depression, and revival. The phenomena and their interpretation.

3 hrs., first half-year. M W F, 9. Prerequisite: Courses 8 and 8B.

**30. Foreign Trade.**

Assistant Professor HUTCHINSON.

A comparative study, from official sources, of selected problems connected with the recent trade of the principal commercial nations. The chief object of the course is to familiarize the student with the use of government trade statistics.

2 hrs., second half-year. Tu Th, 3. Prerequisite: Course 6, at least Junior standing, and a reading knowledge of at least one modern language other than English.

**31. Consular Service.**

Assistant Professor HUTCHINSON.

A brief history of the consular service, followed by a technical study of the training and duties of consuls and the practice of the leading commercial nations in regard to appointments, etc.

2 hrs., first half-year. Tu Th, 3. Prerequisite: At least Junior standing. The consent of the instructor must be obtained before enrollment.

**35. Customs Tariffs and Regulations.**

Dr. LITMAN.

Tariffs and existing reciprocity treaties and agreements of the leading commercial nations with special reference to the

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\* Not to be given in 1907-08.

**Tariff Law and Customs Regulations of the United States.**  
A short tariff history and a general discussion of the aims and means of tariff policies will precede the practical part of the course, which latter will acquaint the student with the problems confronting the American importer and exporter in connection with duties, bounties, etc.

3 hrs., first half-year. M W F, 10. Prerequisite: Course 2.

**\*36. Modern Colonial Economics.**

Dr. LITMAN.

The principal commercial and industrial problems which arise in connection with colonial conditions, as illustrated by the experience of the leading colonizing nations. The object of this course is to acquaint the student with questions confronting a merchant and an investor in different colonies, and to show him how these have been and may be dealt with.

2 hrs., second half-year. Tu Th, 2. Prerequisite: Course 2.

**37. Communication and Transportation.**

Dr. LITMAN.

Means and methods of communication and transportation other than railroads, and their utilization in the service of commerce. An exhaustive study of internal, coast, and trans-oceanic shipping, of modern harbor facilities, of the post, the express, the telegraph, the telephone, etc.

3 hrs., second half-year. M W F, 10. Prerequisite: Course 1 or 2.

**41. Geography of Spanish America.**

Assistant Professor HUTCHINSON.

A general description of the countries of South and Central America; their geology, topography, climate, population, natural resources, industries, foreign trade, etc. The object of the course is to give the student a comprehensive view of conditions existing in these countries and the possibilities of development.

2 hrs., first half-year. Tu Th, 11.

**42. Contemporary Theories of Social Reform.**

Assistant Professor PEIXOTTO.

A study of current schemes for the partial or total reconstruction of industrial society. The course includes a critical examination of the programmes and principles of the leading reform movements of the day. Particular attention is of course

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\* Not to be given in 1907-08.

given to contemporary Socialism in its various aspects, but studies are also made of the nature and present status of Anarchism, Communism, Coöperation, Single Tax, and kindred movements.

3 hrs., first half-year. M W F, 3. Prerequisite: Course 2, and at least Junior standing.

#### **43. History of Social Reform Movements.**

Assistant Professor PEIXOTTO.

An historical review of the more important social movements usually roughly grouped as socialistic. The course aims to sketch the causes, nature, and influences of the more important schemes for social reconstruction which appeared from ancient times up to the Commune of 1871.

3 hrs., second half-year. M W F, 3. Prerequisite: Course 42.

#### **45. Advanced Economics.**

Professor MILLER.

This course is designed for students who wish to make a more thorough study of economic theory than can be undertaken in Courses 1 and 2. The aim is to work out a tenable system of economics on the basis of an examination of the theories of leading writers, past and present.

2 hrs., second half-year. Tu Th, 9. Prerequisite: Course 2, and at least Senior standing.

#### **18. Poverty.**

Assistant Professor PEIXOTTO.

A study of the facts and causes of poverty with a review of the principles of relief. The aim is to give a theoretical and practical survey of the problems and methods of modern charity.

3 hrs., first half-year. Prerequisite: Course 1 or 2, and at least Junior standing.

#### **19. Modern Constructive Philanthropy.**

Assistant Professor PEIXOTTO.

A review of contemporary charitable agencies for improving the conditions of life and work. The settlement movement, tenement commissions, free employment bureaus, public playgrounds, public pawnshops, and similar public and private movements for social betterment are investigated.

3 hrs., second half-year. Prerequisite: Course 18.



**27. Commercial Reviews and Trade Journals.**

Associate Professor MITCHELL.

Reading of current commercial, business, and trade journals, and similar publications.

1 hr., throughout the year; 1 unit each half-year. Tu, 10. Prerequisite: At least Senior standing and 15 units of Economics. Prescribed for all Seniors in the College of Commerce.

**40. Economic Origins.**

Assistant Professor MITCHELL.

An investigation of the origin and early development of fundamental economic habits and institutions.

2 hrs., second half-year. Tu Th, 9. Prerequisite: Courses 1 and 2, and at least Senior standing.

**GRADUATE COURSES.**

See also Courses 10, 11c, 12A, 16B, 40, and 45, above, which are for Graduates and advanced Undergraduates.

**9A. Taxation.**

Associate Professor PLEHN.

An intensive study of the principles of taxation as illustrated by the practices of different countries.

3 hrs., second half-year. Prerequisite: Course 9.

**\*9c. Municipal Finance.**

Associate Professor HATFIELD.

A study of the revenues, expenditures, debt management, and fiscal administration of American cities.

2 hrs., first half-year. Tu Th, 11. Prerequisite: Course 9.

**20. History and Theory of Prices.**

Associate Professor PLEHN.

The methods of scientific investigation applicable to a study of prices and the causes of their fluctuations.

The course runs throughout the year and credit will be given according to work done. A good training in economics and mathematics and a reading knowledge of French and German are prerequisite.

**\*20c. Mathematical Economics.**

Assistant Professor WHITNEY.

The mathematical treatment of the theory of value. A course of reading for graduate students.

1 hr., second half-year. Hours to be arranged. Prerequisite: A thorough course in calculus.

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\* Not to be given in 1907-08.

**26. Seminary in Economics.****Professor MILLER.**

Under this head are included arrangements for the guidance of the work of individual students, or groups of students, competent to engage in economic research. The results will be presented to the seminary for discussion as occasion may suggest. The course runs throughout the year, and credit will be given according to work done.

**38. Commercial Resources of the Spanish-American Countries.****Assistant Professor HUTCHINSON.**

Detailed study of the geography, natural resources, and possibilities of development of these countries, devoting a year to each. In 1907-08 Chile will be studied. Particular attention is given to commercial relations with the United States.

2 hrs., throughout the year. Hours to be arranged. Open only to graduate students who satisfy the instructor of their preparation for the work.

**COURSES IN OTHER DEPARTMENTS.**

**Physical Geography.** [See Geography 7.]

**Assistant Professor HOLWAY.**

**General Introduction to Anthropology.** [See Anthropology 1.]

**Assistant Professor KROEBER.**

**Commerce of China and Japan.** [See Oriental Languages 1A.]

**Professor FRYER.**

**Economic Botany.** [See Botany 14.]

**Dr. H. M. HALL.**

**Organization of the Irrigation Industry.** [See Irrigation 1.]

**Professor MEAD.**

**Formal Logic.** [See Philosophy 1.] **Associate Professor RIEBER.**

**General Psychology.** [See Philosophy 2.]

**Dr. WRINCH.**

**Ethics.** [See Philosophy 4.]

**Professor HOWISON and Assistant Professor HOCKING.**

**ANTHROPOLOGY.**

FREDERIC W. PUTNAM, M.A., Sc.D., Professor of Anthropology and Director of the Museum of Anthropology.

JOHN C. MERRIAM, Ph.D., Associate Professor of Palaeontology and Historical Geology.

ALFRED L. KROEBER, Ph.D., Assistant Professor of Anthropology and Secretary of the Department of Anthropology.

PLINY E. GODDARD, Ph.D., Assistant Professor of Anthropology.

ZELIA NUTTALL, Field Director of Crocker-Reid Researches in Mexico.

SAMUEL A. BARRETT, M.S., Museum Assistant.

THOMAS T. WATERMAN, A.B., Museum Assistant.

EDWARD SAPIR, M.A., Research Assistant.

The Department of Anthropology has been instituted to organize and coördinate the numerous archaeological and ethnological researches supported in behalf of the University by Mrs. Phoebe A. Hearst, and is devoted to investigation, the formation of a museum, and instruction. Extensive collections are available at the Affiliated Colleges in San Francisco as material for research, and in the temporary Museum in Berkeley for illustration of instruction. Certain of the more advanced courses offered are adapted to give systematic training to prospective anthropologists, and as far as feasible are based on museum and field work. A pamphlet descriptive of the organization, work, and collections of the Department will be sent on application to the Secretary of the Department.

**LOWER DIVISION COURSES.****1. General Introduction to Anthropology.**

Assistant Professor KROEBER.

A course of lectures and reading outlining the main facts of the science or history of man, his origin, divisions, physical features, customs, institutions, religion, languages, arts, industries, and the characteristics of the principal races. Special attention will be given to primitive conditions of civilization.

3 hrs., first half-year. M W F, 10.

**2. Introduction to Ethnology.** Assistant Professor GODDARD.

A course of lectures in which the possible origins and the probable lines of development of domestic economy, art, social customs, family and political organization, mythology, and religion are discussed. The course will be illustrated by presenting, with the aid of lantern slides and specimens, typical examples drawn for the most part from North America.

2 hrs., second half-year. Tu Th, 11.

**3. General Ethnography.** Assistant Professor KROEBER.

A course of lectures and reading upon the principal races and peoples of all parts of the world, both past and present, and their distinctive physical, mental, and cultural characteristics.

2 hrs., first half-year. W F, 1. Prerequisite: Anthropology 1 or 2.

**4. Geological History of Man.** Associate Professor MERRIAM.

1 hr., second half-year. Tu, 1. Prerequisite: Geology 5 or 1b.

**14. Comparative Mythology.** Assistant Professor KROEBER.

Lectures on typical mythologies of civilized and uncivilized races of the Old and New World.

1 hr., first half-year. M, 1.

## UPPER DIVISION COURSES.

*(A) Without Prerequisite.***13. The Religious Practices and Beliefs of Non-literary Peoples.**

Assistant Professor GODDARD.

A study of the religious practices connected with the individual and the community, with special attention given to the myths which explain origins and creation, and to beliefs concerning the human soul.

While the material for the course is drawn, for the most part, from the continent of North America, illustrations and comparisons are sought elsewhere. The work consists of reading and lectures followed by discussions.

2 hrs., second half-year. Tu Th, 2.

**18. Introduction to Linguistics.** Assistant Professor GODDARD.

An analytic study of the phonetic and morphological constituents of language, and of linguistic changes and relationships.

The course is intended for those looking forward to work with living languages, but may be taken by any one who satisfies the instructor that he is likely to profit by it.

2 hrs., second half-year. Tu Th, 9.

**6A. Experimental Phonetics.** Assistant Professor GODDARD.

A laboratory course for the study of phonetics from both the physiological and physical sides by means of dissections, direct observation, and experiments with the Rousselot apparatus.

4 hrs., second half-year; 2 units. Hours to be arranged.

**19. North American Languages.** Assistant Professor KROEBER.

An examination, based chiefly on texts, of several Indian languages, with a view to bringing out some of the principal characteristics of the structure of North American languages in general. If desired, opportunity will be given for practical work with Indians. Different subject matter is used in alternate years, so that the course may be taken twice with credit.

3 hrs., first half-year. Hours to be arranged.

**12. The Determination of Linguistic Relationship.**

Assistant Professor KROEBER.

A research course on the problems of linguistic relationship, with special reference to the conditions and causes of groups of grammatically and phonetically similar but lexically unrelated languages; to the criteria and methods of determining genetic relationship; and to its ethnological significance. In these connections practical investigations are carried on.

3 hrs., throughout the year.

*(B) With Prerequisite.*

**5. North American Ethnology.** Assistant Professor KROEBER.

A course of reading and reports, with lectures, on the Indians of two or more regions of distinctive aboriginal culture, selected differently in alternate years from the following: Eskimo, Southwest, Plains, Mexico, California, and North Pacific Coast. The course may be taken with credit for either one or two years.

3 hrs. of credit, first half-year. M, 2-4. Prerequisite: Anthropology 1, or equivalent.

- \*9. North American Archaeology.** Assistant Professor KROEBER.  
3 hrs., first half-year. Prerequisite: Anthropology 1.

**17. Studies in Comparative Mythology.**

Assistant Professor KROEBER.

A research course dealing with certain problems of comparative mythology, such as the question of the independent development or transmission of similar traditions among distinct peoples, and the variations undergone in different periods and regions by the same myths.

3 hrs., throughout the year. Prerequisite: Anthropology 14, or equivalent.

**GRADUATE COURSES.**

- 7. Advanced Work in Ethnology.** Assistant Professor KROEBER.  
Throughout the year.

**8. Advanced Work in Primitive Languages.**

Assistant Professor KROEBER.

Throughout the year.

- 6B. Experimental Phonetics.** Assistant Professor GODDARD.

A laboratory course in which some special problem is undertaken by the student.

4 hrs., second half-year; 2 units.

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\* Not to be given in 1907-08.

**MUSIC.**

JOHN FREDERICK WOLLE, Mus.D., Professor of Music.

**1. Harmony.**

Professor WOLLE.

This course is designed to give to the student a clear conception of notation, intervals, construction of scales, triads, chords, and their relationships, inversions, part-writing, cadences, sequences, key-relationship, suspensions, passing and changing notes, organ-point, transposition, analysis, modulation, and improvisation. Melodies are harmonized.

1 hr., throughout the year. Two sections. F, 4, 5. Prerequisite: A knowledge of the rudiments of music. Some proficiency in the playing of an instrument, preferably the piano, is very desirable but not absolutely necessary.

**2. Counterpoint.**

Professor WOLLE.

The object of this course is the study of melody and of the combination of melodies. It will treat of simple and double counterpoint, imitation, canon, and fugue. Canti Firmi are given, to which are added other voices. Free melodies are treated in combination. The old clefs are studied and used. Playing from score is practiced. Analysis of musical compositions.

1 hr., throughout the year. F, 3. Prerequisite: A thorough knowledge of harmony.

**3. Choral Music.**

Professor WOLLE.

In this course masterpieces of choral composition are studied by the University Chorus, organized in September, 1905, numbering nearly three hundred voices, and the works are prepared for public performance in the Greek Theatre. All students who possess the ability to sing and who have accurate musical ears are urged to apply for admission.

2 hrs., throughout the year; one unit each half-year. Tu, 7:30-9:30 p.m., Hearst Hall.

**SEMITIC LANGUAGES.**

JACOB VOORSANGER, D.D., Honorary Professor of the Semitic Languages and Literatures.

WILLIAM POPPER, Ph.D., Assistant Professor of Semitic Languages.

Students intending to prepare themselves for the ministry or otherwise interested in the work offered by the department are advised, on the basis of a good knowledge of the classical and modern languages, to take in their Junior year Courses 1, 3, and 7A, and in their Senior year Courses 4 or 6B, and 10, or 11, or 13. The graduate work provides for a study of the remaining Semitic dialects and for research along the lines of Semitic philology.

**UPPER DIVISION COURSES.****1. General Introduction to the Study of the Semitic Languages.**

Assistant Professor POPPER.

Lectures on the nature and classification of the Semitic languages, and a general survey of the history and literature of the Semites.

1 hr., throughout the year. F, 10.

**25. The Mohammedan Countries.** Assistant Professor POPPER.

\*(a) History from the rise of Islam to the present day. Lectures with assigned readings on special topics. For students of the Department of History [see under History].

(b) The Modern Levant. Lectures on present-day conditions in Asiatic Turkey.

Courses *a* and *b* in alternate years.

2 hrs., throughout the year. M W, 11.

**7A. Biblical Archaeology.**

Professor VOORSANGER.

Lectures on the languages, customs, civil institutions, religions, etc., of the nations and peoples of the Old Testament, with especial reference to the historical development of the religious and political institutions of the Jewish people.

2 hrs., throughout the year. Tu, 1-3. Open to all students of the University.

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\* Not to be given in 1907-08.



**3. Hebrew.**

Assistant Professor POPPER.

First Course: The elements of the language, with exercises in translating from Hebrew into English and from English into Hebrew, followed by the grammatical interpretation of the Book of Ruth. Text-books: Davidson's Hebrew Grammar; Hebrew Bible, ed. Hahn; Gesenius's Hebrew Lexicon, ed. Brown-Briggs-Driver.

3 hrs., throughout the year. M W F, 9.

**4. Hebrew.**

Assistant Professor POPPER.

Second Course: Rapid reading of selected portions of the Old Testament. Text-books: Hebrew Bible; Gesenius-Kautzsch, Hebrew Grammar, Clarendon Press.

2 hrs., throughout the year. M W, 10. Prerequisite: Course 3.

**7B. Introduction to the Talmud.**

Professor VOORSANGER.

Lectures, with readings from the Mishnah.

**11. Syriac.**

Assistant Professor POPPER.

Text-book: Brockelmann's Syrische Grammatik.

2 hrs., throughout the year.

**13. Arabic.**

Assistant Professor POPPER.

Text-books: Socin's Arabic Grammar; Brünnow's Chrestomathy.

2 hrs., throughout the year. M W, 1.

**GRADUATE COURSES.**

**6B. Exegetical Course.**

Assistant Professor POPPER.

Philological interpretation of Isaiah.

2 hrs., throughout the year. M W, 2. Prerequisite: Course 4.

**10. Biblical and Targumic Aramaic.** Assistant Professor POPPER.

Selections from the Aramaic portions of the Old Testament and from the Targumim. Text-books: Marti's Grammatik der bibl.-aram. Sprache; Merx, Chrestomathia Targumica.

1 hr., throughout the year.

**\*12. Syriac.**

Assistant Professor POPPER.

Rapid reading of various authors, with reference to Nöldeke's Syrische Grammatik.

2 hrs., throughout the year. Tu Th, 9.

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\* Not to be given in 1907-08.

14. **Arabic.** Assistant Professor POPPER.  
Selections from Arabic historians dealing with the Crusades and with the Moslem empire in Spain.  
2 hrs., throughout the year. M W, 3.
- \*5. **Arabic.** Assistant Professor POPPER.  
(a) First half-year. *Delectus Veterum Carminum* (ed. Nöldeke). Second half-year. Interpretation of the *Mu'allaqat*.  
(b) The Koran, with commentary.  
2 hrs., throughout the year. Courses *a* and *b* in alternate years.
- 16A. **Arabic.** Assistant Professor POPPER.  
Study of the modern Syrian dialect of Damascus, on the basis of Hartmann's *Arabischer Sprachführer*, and with the reading of tales and proverbs from various collections.  
2 hrs., throughout the year.
- 16B. **Arabic.** Assistant Professor POPPER.  
Sight reading of selections from the *Thousand and One Nights*.  
1 hr., throughout the year.
19. **Semitic Epigraphy.** Assistant Professor POPPER.  
Interpretation, in successive years, of selected (a) Phoenician, \*(b) Aramaic, and \*(c) South Arabian inscriptions.  
1 hr., throughout the year. Prerequisite for (a), Course 4; for (b), 10 and 12; for (c), 14.

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\* Not to be given in 1907-08.

**ORIENTAL LANGUAGES.**

JOHN FRYER, LL.D., Agassiz Professor of Oriental Languages and Literatures.

YOSHI S. KUNO, M.S., Assistant in Japanese.

In addition to the lecture and language courses given below, Professor Fryer will offer assistance to students who wish to take up other branches of study connected with China and Japan. He will also act as adviser to students coming from and going to the Orient.

Some of the courses are accepted by the College of Commerce and other colleges as part of their regular curriculum or as equivalent for prescribed work. Graduates and undergraduates wishing to take up these Oriental studies may therefore find it to their advantage to consult with the Dean of their college as to the arrangements that can be made in that direction.

**LOWER DIVISION COURSES.****LECTURE COURSES.**

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|--|------------------|
| <b>1. The History of China.</b>  | Professor FRYER. |
| 3 hrs., first half-year. M W F, 4.   |                  |
| <b>11. The History of the Laws, Government, and Social Conditions of China.</b>                    | Professor FRYER. |
| 3 hrs., second half-year. M W F, 4.  |                  |
| <b>*2. The Philosophies and Religions of China: Confucianism and Taoism.</b>                       | Professor FRYER. |
| 3 hrs., first half-year. M W F, 4.   |                  |
| <b>*12. The Philosophies and Religions of China: Buddhism, Mohammedanism, and Other Religions.</b> | Professor FRYER. |
| 3 hrs., second half-year. M W F, 4.  |                  |
| <b>*12A. The Philosophies and Religions of Japan: Ancient and Modern.</b>                          | Professor FRYER. |
| 3 hrs., first half-year. M W F, 4.   |                  |

The above five lecture courses form a series; but any of them may be taken singly. They are adapted for students in general, but particularly for those who look forward to relations with the Orient.

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\* Not to be given in 1907-08.

## LANGUAGE COURSES.

- 3. Elementary Study of Kuan-hua.** Professor FRYER.  
Introduction to Kuan-hua, the language spoken by the officials and about four-fifths of the population of China. Series of progressive elementary lessons and exercises in reading, speaking, translation, and composition.  
6 hrs., throughout the year. M W F, 9.
- 4. Advanced Study of Kuan-hua.** Professor FRYER.  
Series of progressive advanced lessons and exercises in reading, speaking, translation, and composition. Selections from Kuan-hua literature.  
6 hrs., throughout the year. M W F, 10. Prerequisite: Course 3.
- 9. Elementary Study of the Japanese Language.** Mr. KUNO.  
Introduction to the Japanese language, with the use of both the Katakana and Hiragana forms of letters. Series of progressive elementary lessons and exercises in reading, speaking, and writing.  
3 hrs., throughout the year. M W F, 1.
- 9A. Second Year of Elementary Japanese.** Mr. KUNO.  
This is a continuation of the preceding course, introducing the use of the common Chinese Characters; with selections from modern Japanese writers.  
3 hrs., throughout the year. M W F, 3.
- 9B. Elementary Japanese: Double Series.** Mr. KUNO.  
This course combines the work of Courses 9 and 9A, and is intended for beginners who wish to prepare in one year for Course 10.  
3 hrs., throughout the year. M W F, 8.
- 10. Advanced Study of the Japanese Language.** Mr. KUNO.  
Series of progressive advanced lessons and exercises in reading, speaking, translation, and composition, with selections from the best Japanese literature.  
3 hrs., throughout the year. M W F, 11. Prerequisite: Course 9B.

UPPER DIVISION COURSES.

LECTURE COURSES.

**1A. The Commerce of China and Japan: Historical Features.**

Professor FRYER.

3 hrs., first half-year. M W F, 1.

**1B. The Commerce of China and Japan: Geographical Features.**

Professor FRYER.

3 hrs., second half-year. M W F, 1.

**\*11A. The Commerce of China and Japan: Economic Features.**

Professor FRYER.

3 hrs., first half-year. M W F, 1.

**\*11B. The Commerce of China and Japan: Political Features.**

Professor FRYER.

3 hrs., second half-year. M W F, 1.

The above four lecture courses form a series; but any of them may be taken singly. They are adapted for students in general, but particularly for those in the College of Commerce.

**2A. Chinese Literature.**

Professor FRYER.

A course of lectures on English translations of the principal books of China.

1 hr., second half-year. M, 11.

**2B. Chinese Language.**

Professor FRYER.

A course of lectures on the principal features of the Chinese spoken and written language.

1 hr., first half-year. M, 11.

LANGUAGE COURSES.

**5. Elementary Study of Wen-li.** Professor FRYER and Mr. KUNO.

The classical written language of the empires of China and Japan. Progressive selections from various kinds of current literature and official documents, with exercises in translation and composition. Selections from the Four Books.

The Japanese section is taught by Mr. KUNO.

6 hrs., throughout the year. Prerequisite: Course 4 or 10.

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\* Not to be given in 1907-08.

**6. Advanced Study of Wen-li.** Professor FRYER and Mr. KUNO.

Progressive selections from the higher classical literature, with exercises in translation and composition. Selections from the Five Classics, essays, technical books, and poetry.

The Japanese section is taught by Mr. KUNO.

6 hrs., throughout the year. Prerequisite: Course 5.

## GRADUATE COURSES.

**14. Oriental Seminar.**

Professor FRYER.

Philological problems relating to the language, literature, history, and other subjects connected with the Far East.

2 hrs., first half-year. Tu, 4-6. Prerequisite: Sufficient Preparatory work in the Oriental or other departments of the University.

**15. Oriental Seminar.**

Professor FRYER.

International problems relating to commercial, diplomatic, educational, and other branches of intercourse with the Far East.

2 hrs., second half-year. Tu, 4-6. Prerequisite: Same as Course 14.

Courses 14 and 15, though primarily for Graduates, are, under certain conditions, open to properly qualified Seniors. They may be repeated indefinitely, without duplication of work.

**SANSKRIT.**

ARTHUR W. RYDER, Ph.D., Instructor in Sanskrit.

**UPPER DIVISION COURSES.**

1. **Elementary Sanskrit.** Dr. RYDER.  
Perry's Primer; Whitney's Grammar; Lanman's Reader. Grammar, composition, and reading.  
3 hrs., first half-year. M W F, 11.
2. **Elementary Sanskrit (continued).** Dr. RYDER.  
The classical texts in Lanman's Reader, and other easy Sanskrit. Reading at sight.  
3 hrs., second half-year. M W F, 11.
3. **Second-year Sanskrit.** Dr. RYDER.  
Rapid reading of simple classical texts. The fables of the Hito-padeṣa.  
3 hrs., first half-year.
4. **Second-year Sanskrit (continued).** Dr. RYDER.  
Classical Sanskrit texts. Selections from the Kathāsaritsāgara and Daṣakumāracarita.  
3 hrs., second half-year.
5. **Advanced Classical Sanskrit.** Dr. RYDER.  
Reading of more difficult texts, and study of their position in the literature. The Epigrams of Bhartrihari. The Meghadūta of Kālidāsa.  
3 hrs., first half-year.
6. **Advanced Classical Sanskrit (continued).** Dr. RYDER.  
Introduction to the drama, and to the Prākṛit languages. The Ākuntalā of Kālidāsa. The Mricchakatika of Śūdraka.  
3 hrs., second half-year.

The reading matter of courses 3, 4, 5, and 6 may be varied in accordance with the tastes and purposes of the students.

## SANSKRIT LITERATURE.

The following courses do not require a knowledge of any Indian language, and are open to all students of the Upper Division. Together, they aim to give an outline history of Sanskrit literature, but any one of them may be taken independently.

**20. The Veda and the Philosophical Systems.**

Dr. RYDER.

Lectures and reading. In connection with an outline of Vedic literature, the earlier forms of Brahmanism will be treated; then the development of ritualism and of philosophy, the revolt which found expression in Buddhism and Jainism, the struggle between Brahmanism and Buddhism, and the rise of Hinduism.

2 hrs., first half-year. Tu Th, 11.

**21. Classical Sanskrit Literature.**

Dr. RYDER.

Lectures and reading. Outline treatment of the great epics, and of the classical literature, exclusive of the drama. The following subjects will be treated. The *Mahābhārata*; the *Rāmāyana*; the *Kāvya*'s (minor epics); lyric and elegiac poetry; novels and romances; fables and epigrams; the law-books; rhetoric and poetics; scientific literature.

2 hrs., second half-year. Tu Th, 11.

**\*22. The Sanskrit Drama.**

Dr. RYDER.

Lectures and reading. The Hindu canons of dramaturgy. Dramatic production in India, from its beginnings in the *Rig-veda*, with special study of the masterpieces of the classical period.

2 hrs., second half-year. Tu Th, 2.

\* Not to be given in 1907-08.



**GREEK.**

\*EDWARD B. CLAPP, Ph.D., Professor of the Greek Language and Literature.

ISAAC FLAGG, Ph.D., Associate Professor of Greek.

JAMES T. ALLEN, Ph.D., Assistant Professor of Greek.

WILLIAM S. FERGUSON, Ph.D., Associate Professor of Greek and Roman History.

HENRY W. PRESCOTT, Ph.D., Assistant Professor of Classical Philology.

IVAN M. LINFORTH, Ph.D., Instructor in Greek.

MONROE EMANUEL DEUTSCH, M.A., Assistant in Greek.

WINTHROP L. KEEP, M.A., Reader in Greek.

ALBIN PUTZKER, M.A., Honorary Professor and Lecturer in German Literature.

**Teacher's Certificates.** Students will be recommended for teacher's certificates who shall have completed with credit Course 6 in addition to twenty-one units of University work in Greek.

**LOWER DIVISION COURSES.**

Course A is designed for students who desire to begin the study of Greek after entering the University: Course B is provided for students who have credit for matriculation subject 8 only. Courses 1 and 2 constitute the regular Freshman work in Greek and are prescribed for the degree of Bachelor of Arts.

**A. Elementary Greek: Xenophon's Anabasis.** Mr. DEUTSCH.

5 hrs., throughout the year. M Tu W Th F, Section I, 9; Section II, 3. [If taken as work of the Upper Division, this course counts as three units each half-year, instead of five.]

Thorough drill in the essentials of Greek grammar, with systematic study of vocabulary and practice in the writing of easy Greek; Xenophon's Anabasis, Books I-II, careful study of selected passages, with rapid reading of more extended portions. This course is intended as an equivalent for matriculation subject 8, and may be counted for prescribed or free elective work, in all colleges except the College of Letters, subject to their regulations, by students who enter without Greek.

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\* Absent on leave, 1907-08.

**B. Attic Prose; Homer's Iliad.**

Dr. LINFORTH.

3 hrs., throughout the year. M W F, 2. Prerequisite: Greek A, or Matriculation Subject 8.

This course covers the same ground as matriculation subject 9, and is provided for students who have completed only Course A. It may be counted for free elective work in the College of Letters by students who enter with the minimum of Greek, and for prescribed or free elective work in all colleges, subject to their regulations. Students who take this course in their Freshman year should take Courses 1 and 2 in their Sophomore year. It is not impossible for such students to do advanced work in Greek and even to receive a teacher's certificate at graduation.

The first term [B i] is devoted (1) to the reading of selections from Xenophon's *Memorabilia*; (2) to the careful study of the meaning of the commonest Greek words, the inflectional endings, and the word-order; and (3) to practice in writing Greek. The second term [B ii] is devoted to the reading of Homer's *Iliad* Bks. I-III, and to the mastering of the elements of the Homeric dialect. Students who are deficient in matriculation subject 9a, but not in 9b, may take B i without being required to continue the course in the second term. But B ii must be preceded by B i.

**1. Homer's Iliad—Books XIII-XXIV.**

Assistant Professor ALLEN.

The chief object of this course is to gain the ability to read Homer with accuracy and ease. To this end a careful study is made of Bk. XXII, accompanied by the more rapid reading of other passages. Considerable attention is given also to Homeric life and art, and to Homer's style and literary influence.

3 hrs., first half-year. M W F, Section I, 8; Section II, 9. Prerequisite: Matriculation subjects 8 and 9, or Greek A and B.

**2. Plato's Apology and Crito.**

Assistant Professor ALLEN.

This course is intended to carry forward the student's training in the vocabulary, syntax, and style of Attic prose, without, however, neglecting the historical and literary questions involved in the study of the Apology.

3 hrs., second half-year. M W F, Section I, 8; Section II, 9. Prerequisite: Same as for Course I.

## FREE ELECTIVE COURSES IN THE LOWER DIVISION.

The following one-hour courses are intended to furnish additional training, besides the required work, to students in the Freshman and Sophomore classes who desire to give special attention to Greek, and to acquire as early as possible the ability to read Greek prose in the order of the thought at sight. Students who desire to add to the normal 12 units of Greek in the Lower Division may elect Course 13 in conjunction with 1, 14 with 2, 15 with 7, and 16 with 9.

**13. Greek Historical Prose: Arrian, Dion of Prusa, Lucian.**

Associate Professor FLAGG.

Rapid reading, with frequent written tests in translation at sight.

1 hr., first half-year. W, 11. Prerequisite: Matriculation subject 9, or Greek B.

**14. Greek Historical Prose. [A continuation of Course 13.]**

Associate Professor FLAGG.

1 hr., second half-year. W, 11. Prerequisite: Matriculation subject 9, or Greek B.

**15. Greek Historical Prose: Thucydides, Xenophon.**

Associate Professor FLAGG.

Rapid reading, with frequent written tests in translation at sight.

1 hr., first half-year. Th, 11. Prerequisite: Course 2.

**16. Greek Historical Prose. [A continuation of Course 15.]**

Associate Professor FLAGG.

1 hr., second half-year. Th, 11. Prerequisite: Course 1.

**7. Introduction to Greek Tragedy.**

Dr. LINFORTH.

The Iphigenia among the Taurians and the Medea of Euripides, with practice in the intelligent reading of the trimeters and anapaests. In connection with this course a series of informal lectures will be given, on the representation of Greek dramas, and on the artistic form and structure of Greek tragedy.

3 hrs., first half-year. M W F, 10. Prerequisite: Courses 1 and 2, or first or second grade of scholarship in Course 2.

**9. Thucydides. Book I.**

Dr. LINFORTH.

3 hrs., second half-year. M W F, 10.

## COURSES IN GREEK COMPOSITION.

A series of four courses in writing Greek, progressively arranged. Each weekly exercise is based directly upon some prescribed passage of Xenophon or Plato; and to meet the test of writing a true reading power is demanded. Courses 5 and 6 are open to students who have completed with credit Courses 3 and 4. Since these courses are necessary for recommendation for the teacher's certificate, students are advised to take Course 3 not later than the beginning of the Sophomore year.

3. **The Writing of Attic Prose.** Associate Professor FLAGG.

This course is open to all students of Greek, with the consent of the instructor; but in order to be promoted to Course 4 the candidate must evince by his written performances a tolerably sure mastery of the ordinary forms and fundamental principles of the language.

1 hr., first half-year. S, 8.

4. **The Writing of Attic Prose.** Associate Professor FLAGG.

A continuation of Course 3.

1 hr., second half-year. S, 8. Prerequisite: First or second grade of scholarship in Course 3.

5. **The Writing of Attic Prose.** Associate Professor FLAGG.

1 hr., first half-year. S, 9. Prerequisite: First or second grade of scholarship in Course 4.

6. **The Writing of Attic Prose.** Associate Professor FLAGG.

Translation from Latin into Greek.

1 hr., second half-year. S, 9. Prerequisite: First or second grade of scholarship in Course 5.

## UPPER DIVISION COURSES.

The following courses are open to graduates and undergraduates who have completed Courses 1, 2, and 7, together with the special prerequisites named under the several courses. Courses 1, 2, 7, and 9 constitute the regular introduction to Upper Division work in Greek. But Course 40 forms an exception to this rule in regard to prerequisites.

12. **Homer.** Associate Professor FLAGG.  
Rapid reading, with frequent written tests in translation at sight. In 1907-08, the *Odyssey*. This course may be elected two years in succession without repetition of subject-matter.  
3 hrs., first half-year. M W F, 10.
26. **Hesiod and the Homeric Hymns.** Dr. LINFORTH.  
2 hrs., first half-year. Tu Th, 9.
36. **The Third and Fourth Books of Thucydides.** Associate Professor FLAGG.  
2 hrs., first half-year. Tu Th, 10. Additional prerequisite: Course 6.
49. **Greek Epigram.** Assistant Professor PRESCOTT.  
Reading of epigrams selected from the Greek Anthology, with some account of the development of this literary type.  
2 hrs., first half-year. M W, 3.
27. **The Philoctetes of Sophocles.** Associate Professor FLAGG.  
2 hrs., second half-year. Tu Th, 10. Additional prerequisite: First or second grade of scholarship in Course 5.
8. **Herodotus.** Associate Professor FLAGG.  
Rapid reading, with frequent written tests in translation at sight.  
The course in Herodotus may be elected two years in succession without repetition of subject-matter.  
3 hrs., second half-year. M W F, 10.
30. **Theocritus, Bion, and Moschus.** Assistant Professor PRESCOTT.  
Reading of the bucolic idylls and the mimes of Theocritus, with comparative study of the idylls of Bion and Moschus, and of the mimes of Herondas. Lectures on the beginnings and the development of Greek bucolic poetry.  
2 hrs., second half-year. M W, 3.
- 48B. **Greek Tragedy.** Dr. LINFORTH.  
Reading of the *Bacchae* and the *Iphigenia at Aulis* of Euripides, with literary and dramatic interpretation, and lectures on the origin and character of Greek tragedy as a form of art.  
2 hrs., second half-year. Tu Th, 9.

**40. Greek and Roman Architecture and Sculpture.**

Assistant Professor ALLEN.

Lectures in the Museum of Greek and Roman casts. Open to all students in the Upper Division.

2 hrs., second half-year. Tu Th, 2.

**45. Modern Greek.**

Professor PUTZKER.

An introduction to the literary and spoken language of the Greeks of to-day. Selected readings and exercises in conversation.

2 hrs., throughout the year. Tu Th, 11.

## GRADUATE COURSES.

The following courses are intended for graduate students only, but many graduate students will find it profitable to take also some of the Upper Division Courses for undergraduates. See p. 67.

**55. Studies in the History of Greek Drama.**

Assistant Professor ALLEN and Dr. LINFORTH.

A critical examination of the evidence, both literary and archaeological, bearing upon Greek dramatic presentation, accompanied by a careful reading of selected plays with particular reference to dramatic art. Investigation of special problems.

2 hrs., throughout the year.

**56. Principles of Textual Criticism.** Assistant Professor ALLEN.

Training in the methods and the principles involved in the scientific determination of an ancient Greek text. The study will be based upon the *Medea* of Euripides.

2 hrs., first half-year.

**57. Dionysius of Halicarnassus: De Antiquis Oratoribus, De Admiranda Vi Dicendi in Demosthene.**

Assistant Professor ALLEN.

An introduction to Greek literary criticism. Qualified Seniors may be admitted to this course after consultation with the instructor.

2 hrs., second half-year.

**LATIN.**

WILLIAM A. MERRILL, Ph.D., L.H.D., Professor of the Latin Language and Literature.

LEON J. RICHARDSON, A.B., Associate Professor of Latin.

CLIFTON PRICE, Ph.D., Assistant Professor of Latin.

HERBERT C. NUTTING, Ph.D., Assistant Professor of Latin.

HENRY W. PRESCOTT, Ph.D., Assistant Professor of Classical Philology.

TORSTEN PETERSSON, Ph.D., Instructor in Latin.

**Classification of Courses.** Courses A to 10, inclusive, may be counted for the prescribed or elective work in the colleges of general culture, and are planned especially for students in the Lower Division. All courses in the Lower Division may be taken as free-elective work in the Upper Division. The specific Upper Division courses are divided into advanced, or major, courses, and free-elective courses, to both of which certain Lower Division courses in Latin are prerequisite. Attention is called particularly to the value and aim of the courses in sight translation.

**Teachers' Certificates.** The requirements for recommendation by the department, at the end of the period of graduate residence, are normally (a) 30 units of work in Latin, which must include Course 4, and must be distributed in such a way as to show acquaintance with Ante-Classical and Imperial Latin, and with poetry as well as prose; (b) Greek, Course A (or its equivalent); (c) a reading knowledge of German. Candidates should arrange a programme with the head of the department not later than the beginning of the Senior year.

**Honors.** Provision has been made for graduation with Honors in Latin. Candidates should consult the head of the Department for information.

**LOWER DIVISION COURSES.**

**A. Virgil's Aeneid.**

3 hrs., throughout the year. M W F, 9. Prerequisite: Matriculation subject 7a. Six books of the Aeneid will be read.

This course may be counted for prescribed or elective work. It is identical with matriculation subject 7b.

1. **Cicero and Pliny.** Assistant Professors PRICE and PRESCOTT,  
— — —, and Dr. PETERSSON.

The Cato Maior of Cicero, eight weeks, and the Letters of Pliny, eight weeks. Systematic study of syntax and synonyms. Practice in reading aloud and in translation at hearing, and in pronunciation, phrasing, and emphasis.

3 hrs., either half-year. First half-year, five sections. M W F, 8, 10, Assistant Professor PRICE; 9, Dr. PETERSSON; Tu Th S, 8; Dr. PETERSSON; 9, — — —. Second half-year, one section. M W F 9, Assistant Professor PRESCOTT. Prerequisite: Matriculation subject 7b or Course A. Prescribed in the College of Letters. It may be counted for prescribed or elective work in the Colleges of Social and Natural Sciences, and as a free elective in other colleges.

2. **Livy and Plautus.** Assistant Professors PRICE and PRESCOTT,  
— — —, and Dr. PETERSSON.

Selections from Livy, eight weeks, and rapid reading of one play of Plautus.

3 hrs., either half-year. First half-year, one section. Tu Th S, 8, Assistant Professor PRESCOTT. Second half-year, five sections. M W F, 8, 10, Assistant Professor PRICE; 9, Dr. PETERSSON; Tu Th S, 8, Dr. PETERSSON; 9, — — —. Prerequisite: Course 1. Prescribed in the College of Letters. It may be counted for prescribed or elective work in the Colleges of Social and Natural Sciences, and as a free elective in other colleges.

5. **Horace and Virgil.** Associate Professor RICHARDSON,  
Assistant Professor PRICE, and — — —.

The Odes and Epodes of Horace. Private reading of selections from Virgil's Aeneid, VII-XII.

3 hrs., first half-year. Three sections. M W F, 9, Assistant Professor PRICE; 10, — — —. Tu Th S, 10, Associate Professor RICHARDSON. Prerequisite: Course 2, completed or in progress.

7. **Tacitus.** Assistant Professor PRESCOTT.

The Germania and Agricola of Tacitus.

2 hrs., second half-year. Tu Th, 8. Prerequisite: Course 5.



**8. Cicero, Letters; Roman Literature.**

Associate Professor RICHARDSON.

Select letters of Cicero. Mackail's *Roman Literature*.

3 hrs., second half-year. Tu Th S, 10. Prerequisite: Course 5.

**10. Horace, Satires, and Epistles.** Assistant Professor PRICE.

A course for training in rapid reading.

2 hrs., second half-year. M W, 9. Prerequisite: Course 5.

**COURSES IN SIGHT TRANSLATION.**

The object of these courses is to gain ability to read the Latin language with facility similar to that secured in the study of modern languages. Courses 1B and 5B will be found especially useful to Upper Division students who have found it necessary to give up the study of Latin in the ordinary courses.

**1B. Sight Translation I.** Associate Professor RICHARDSON.

Practice in reading at sight from easy authors, with incidental interpretation.

2 hrs., throughout the year; 1 unit each half-year. M W, 2. Prerequisite: Matriculation subject 7a. This course may be counted for prescribed or elective work. It is intended especially for Freshmen, but may be taken by more advanced students, in either the Lower or Upper Division, who do not pursue other courses in Latin; or without credit by advanced students in Latin.

**5B. Sight Translation II.** Assistant Professor PRESCOTT.

Translation at sight of more difficult Latin.

2 hrs., throughout the year; 1 unit each half-year. M W, 2. Prerequisite: Course 5 completed or in progress, or 1B. This course is intended especially for Sophomores, and may be taken by more advanced students, whether pursuing other courses in Latin or not; but as a free elective and not as advanced work in the Upper Division.

**49. Sight Translation III.** Professor MERRILL.

Exercises in translating at sight selections from the prose literature of the Empire.

2 hrs., second half-year. M W, 11. Prerequisite: Course 5 or 5B, and Junior standing.

## COURSES IN LATIN WRITING.

The object of the courses in Latin writing is, at first, training in forms and syntax; later, in idiom, style, and periodology, through imitation of classical examples; and, finally, in original composition.

**C. Latin Composition.** — — —

1 (or 2) hrs., throughout the year. F, 1. Prerequisite: Matriculation subject 6*b*. It may be counted for prescribed or elective work, and is identical with matriculation subject 7*c*<sup>1</sup> and 7*c*<sup>2</sup>. This course may be taken as a two-hour course as an equivalent of matriculation subject 7*c*.

**3. Latin Composition, I.**

Assistant Professor NUTTING.

Exercises in writing Latin prose narrative.

1 hr., throughout the year. Three sections. Th, 1, 2, 3. Prerequisite: Matriculation subject 7*c*, or its equivalent.

**4. Latin Composition, II.**

Dr. PETERSSON.

Writing Latin in periodic style. Retranslation of English versions of Latin and Greek authors and of selections from English classic writers.

1 hr., throughout the year. Three sections. Tu, 1, 2, 3. Prerequisite: Course 3. This course may be counted as advanced work if taken in the Upper Division.

**12. Latin Composition, III.**

Associate Professor RICHARDSON.

Extended idiom; translation of English masterpieces. Training in Latin expression and construction.

1 hr., throughout the year. F, 2. Prerequisite: Course 4. This course may be counted for advanced work.

**13. Latin Composition, IV.** — — —

Original Latin composition: practice in narrative and argumentation.

1 hr., throughout the year. Prerequisite: Course 12. This course may be counted for advanced work.

**85. Advanced Latin Composition.** [See graduate courses.]

## UPPER DIVISION COURSES.

### FREE ELECTIVES.

Courses A, 1, 2, 5, 7, 8, 10, author courses; 1B, 5B, 49, sight reading; C, 3, 4, composition courses, all of which are described above with the prerequisites necessary, may be taken as free electives by students in the Upper Division.

The following free-elective courses are also offered; the prerequisite for all of them is Course 5 or 5B, and Junior standing.

#### 14C. Seneca: Essays. Professor MERRILL.

Lecture course, with translation and exegesis.

1 hr., first half-year. F, 10.

#### 14D. Cicero: De Legibus. Professor MERRILL.

Lecture course, with translation and exegesis.

1 hr., second half-year. F, 11.

NOTE.—Course 14D will not be given if Course 81 is desired by a sufficient number of students.

#### 35. Teachers' Training Course. Associate Professor RICHARDSON.

Problems in teaching Latin; estimates of text-books. Examinations of questions in pronunciation and syntax; exercises in teaching preparatory authors.

3 hrs., second half-year. M W F, 3. Additional prerequisite: Senior or Graduate standing.

#### 49. Sight Translation, III. [See above.]

#### 71. Livy. Assistant Professor NUTTING.

Rapid reading from the first decade, and reading at sight.

2 hrs., first half-year. Tu Th, 9.

### MAJOR COURSES.

The advanced courses in the Upper Division presume a working knowledge of German and French. The specific prerequisite for all of them is one course selected from Courses 6 to 10; or credit for Courses 5 and 5B.

#### 4. Latin Composition, II. [See above.]

#### 12. Latin Composition, III. [See above.]

13. **Latin Composition, IV.** [See above.]14E. **Cicero: De Officiis.** Assistant Professor NUTTING.

A study of practical ethics as set forth by Cicero.

3 hrs., second half-year. M W F, 1.

16. **Ovid; Propertius.** Associate Professor RICHARDSON.

Ovid, *Fasti*; Propertius, Book IV. Roman religion and folklore, with modern parallels.

3 hrs., first half-year. Tu Th, 11, and a third hour.

17. **Virgil's Georgics.** Associate Professor RICHARDSON.

Reading, translation, and exegesis. Theory of the Virgilian hexameter, and the art of reading classical Latin poetry.

3 hrs., second half-year. Tu Th, 11, and a third hour.

18A. **Tacitus: Histories.** Assistant Professor NUTTING.

Selections from the Histories of Tacitus.

3 hrs., second half-year. Tu Th S, 8.

19. **Patristic Latin.** Professor MERRILL.

Tertullian's Apology and the Christian Hymn Writers, with particular reference to the language.

3 hrs., first half-year. M W F, 11.

21. **Elementary Roman Law.** Professor MERRILL.

The Institutes of Justinian.

2 hrs., first half-year. M W, 10. Students electing this course are advised to take also Course 5 (Roman Law) in the Department of Jurisprudence. The main object of the course is to secure facility in reading Law Latin. This course is also listed in the Department of Jurisprudence.

23. **Tacitus, Suetonius.** Professor MERRILL.

Tacitus, *Annals*; Suetonius, *Tiberius*. The character of Tiberius.

3 hrs., second half-year. M W F, 10.

24. **Early Latin.** Professor MERRILL.

A selection of inscriptions, together with the fragments of the early literature in prose and poetry. Lindsay's *Inscriptions*, Merry's *Fragments*.

2 hrs., first half-year. M W, 10.

NOTE.—Course 24 will not be given if Course 21 is desired by a sufficient number of students.

**25B. Lucretius: De Rerum Natura.**

Dr. PETERSSON.

Criticism and interpretation of the poem and outline of the Epicurean system.

3 hrs., first half-year. M W F, 4.

**26. Quintilian: Institutio Oratoria.**

Associate Professor RICHARDSON.

The theory of education and the theory of oratory, together with the bearing of these on the training of a lawyer. Comparison of Quintilian's theory with that of his predecessors and followers.

3 hrs., first half-year. M W F, 3.

**39A. Roman Comedy.**

Assistant Professor PRESCOTT.

The *Mostellaria*, *Captivi*, and *Rudens* of Plautus, and the poet's relation to the development of ancient comedy.

3 hrs., first half-year. M W F, 8.

**39B. Roman Comedy.**

Dr. PETERSSON.

The *Phormio*, *Eunuchus*, *Adelphi*, and *Andria* of Terence. Study of the language and versification, and of the poet's relation to his sources and to earlier comedy, with some consideration of the customs of the Roman stage.

3 hrs., second half-year. M W F, 4.

**40A. Latin Grammar: Forms; Syntax of the Noun.**

Assistant Professor NUTTING.

A study of the forms of the Latin language, based on a textbook; lectures on the syntax of the cases.

2 hrs., first half-year. M W, 2.

**40B. Latin Grammar: Syntax of the Verb.**

Assistant Professor NUTTING.

A survey of some of the important problems of Latin syntax. Preparation of assigned work and lectures.

2 hrs., second half-year. M W, 2.

**41. Palaeography and Text Criticism.** Assistant Professor PRICE.

Lectures on palaeography and practice in reading fac-similes and original manuscripts. Practical exercises conducted by students.

3 hrs., second half-year. Tu, 1; Th, 1, 2.

**53. Roman Private Life.**

Lectures illustrated from the antiquities of Pompeii and Rome.  
Collateral reading with reports.

2 hrs., first half-year. Tu Th, 10.

**54. Roman Topography.**

Illustrated lectures on the topography and monuments of Ancient Rome. Collateral reading and reports.

2 hrs., second half-year. Tu Th, 10.

**60A. Roman Epigraphy.**

Assistant Professor PRICE.

Lectures on epigraphy, and exercises in interpretation of Inscriptions in the Corpus and from squeezes and fac-similes.

3 hrs., first half-year. Tu, 1; Th, 1, 2.

**66. Catiline's Conspiracy.**

Assistant Professor NUTTING.

A study from the sources, of the causes and events of Catiline's conspiracy. The data will be collected in part through private reading.

3 hrs., first half-year. M W F, 1.

**73. The Aeneid of Virgil.**

Assistant Professor PRESCOTT.

Review of the Aeneid, I-V, VII-XII; lectures on the sources, composition, and literary technique; brief special reports on assigned topics.

3 hrs., first half-year. M W F, 9.

**81. Select Titles from the Digest.**

Professor MERRILL.

Books 18, 19, 20, 21, and 13.7, being part of the law of contracts.

1 hr., second half-year. F, 11; 3 units. The previous consent of the instructor must be obtained before registration in this course. Courses 21 and 81 are also listed in the Department of Jurisprudence.

**86B. Ovid's Minor Poems.**

Assistant Professor PRESCOTT.

Rapid reading of selections from the Amores, Heroides, Tristia, and Ex Ponto.

2 hrs., second half-year. M W, 8.

**87. The Sixth Book of the Aeneid.**

Assistant Professor PRESCOTT.

Lectures on the sources, composition, and significance of the sixth book of the Aeneid.

1 hr., second half-year. F, 8.

GRADUATE COURSES.

30. **Latin Verse Composition.** Associate Professor RICHARDSON.  
Writing of Latin hexameters, elegiacs, sapphics, asclepiads, and alcaics.  
Seniors who have completed Course 12 may be admitted after consultation with the instructor.  
1 hr., throughout the year.
34. **Latin Seminary.** Professor MERRILL.  
Criticism and interpretation of the works of Propertius. Training in philological method and in textual criticism.  
3 hrs., throughout the year. Tu, 4; S, 10-12. Required of all candidates for higher degrees who make Latin their major subject.
59. **Seminary in Latin Syntax.** Assistant Professor NUTTING.  
The subject for investigation will be the conditional or concessive sentence. The work of the first half-year will be mainly the collection of material; the second half will be devoted to seminary exercises. A reading knowledge of German is essential. Open to qualified Seniors with permission of the instructor.  
2 hrs., throughout the year.
- 60B. **Roman Epigraphy.** Assistant Professor PRICE.  
Lectures on epigraphy, and exercises in interpretation of inscriptions in the Corpus and from squeezes and fac-similes.  
Continuation of Course 60A. Open also to qualified Seniors.  
3 hrs., second half-year.
84. **Studies in Virgil.** Assistant Professor PRESCOTT.  
The development of the legend of Aeneas before the time of Virgil, and the modifications of the legend by Virgil. Collection of the material from original sources, and critical study.  
2 hrs., first half-year. Th, 4-6.
85. **Advanced Latin Composition.** Assistant Professor NUTTING.  
A course in composition from the point of view of teaching the subject. Practice in correcting papers, and in the making of English exercises for translation into Latin. Collection of material bearing on the style and idiom of Cicero.  
1 hr., first or second half-year as may be determined on consultation with the instructor. F, 4.

**ENGLISH.**

\*CHARLES MILLS GAYLEY, Litt.D., LL.D., Professor of the English Language and Literature.

CORNELIUS B. BRADLEY, M.A., Professor of Rhetoric.

WILLIAM D. ARMES, M.L., Assistant Professor of English Literature.

THOMAS F. SANFORD, A.B., Assistant Professor of English Literature.

CHAUNCEY W. WELLS, A.B., Assistant Professor of English Composition.

MARTIN C. FLAHERTY, Ph.B., Assistant Professor of Forensics.

WALTER M. HART, Ph.D., Assistant Professor of English Philology.

LUCY SPRAGUE, A.B., Assistant Professor of English and Dean of Women.

BENJAMIN P. KURTZ, Ph.D., Instructor in English.

CHARLES D. VON NEUMAYER, Instructor in Public Speaking.

GEORGE A. SMITHSON, M.L., Instructor in English Philology.

— — —, Assistant in English.

WILLIAM WHITTINGHAM LYMAN, A.B., Reader in English Literature.  
(Seven Readers in Composition.)

**LOWER DIVISION COURSES.**

**Prescribed and Prerequisite Courses.** Regular students who undertake the work of this department must have credit for entrance English 1 or 14, and special students must have credit for A, 1, and 14. Of the University courses, 1 and 2 must precede those constituting a major subject under Upper Division courses. Courses 1A and 1B or 1C fulfill the prescription for the Colleges of Letters, Social Sciences, and Natural Sciences, Commerce, Agriculture, and Chemistry. In the last three colleges, however, the prescription may be satisfied by taking 1A and three units from Courses 3, 4, and 5. Courses 1, 3, 4, and 5 are especially adapted to the needs of students in the colleges of Commerce and applied science.

**Elective Courses.** Courses listed 3 to 5, inclusive, are open to all students, subject only to the restrictions stated under each course. Courses 11A, 14A, 16A, and 17A also may be taken as Lower Division electives by Sophomores.

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\* Absent on leave, 1907-08.



## UPPER DIVISION COURSES.

**Major Courses.** The major subject may be made from any of the Upper Division courses, except 6B, 7D, 7E, 7F, 7G, 16A, 17A. It must be preceded by Courses 1 and 2, and must include at least one course dealing with the history of the language (11A, 14A, or 14D). Students are recommended, but not required, to include also in the list a course in composition, 6-8; a course in the theory of literature, 9-10; and one in authors, literary types, periods or movements, 13B to 23. The requirements for honors, below, indicate the aim and scope of such higher study in English.

**Elective Courses.** Courses 6B, 7D, 7E, 7F, 7G, 14A, 16A, 17A, 18A, 22A, are open as electives, without the prerequisite of Courses 1 and 2, to all students in the Upper Division. To all other courses Courses 1 and 2 are prerequisite. For Courses 7B, 7C, 7F, 7G, 12A, 12B, 13A, 17C, there are other specific requirements as severally stated. Any course in English, no matter where listed, may, of course, be pursued as an elective by students in the Upper Division who have fulfilled the requirements.

**For Honors,** the requirement in units is the same as for a Major in English; but candidates will be expected to satisfy the Department of English, in a special examination, that they have at least two of the following equipments:

1. A scholarly acquaintance with each of the three main periods of the English language and with the history of its development to the present time;
2. Familiarity, obtained at first hand, with the chief masterpieces of English literature, with the history of its development, and with the principles and methods of historical study;
3. Satisfactory special knowledge of one of the greater authors or of one of the main literary movements;
4. Training in the principles of poetry and prose, and in the methods of criticism requisite to the advanced study of literature;
5. Skill in organizing and presenting thought, orally and in writing.

The candidate must also write a satisfactory essay dealing with some aspect of one of the subjects 1-4, listed above.

**For the Teacher's Certificate,** the candidate must pass a final examination in subjects 1-5, listed in the preceding paragraph (save

any which he may have already passed in the Honors examination). The emphasis in this examination will be laid, not so much on detailed information as (a) on grasp of the subject of English in its twofold aspect—the language and the literature—and (b) on scholarly methods and workmanship.

Candidates are warned against supposing that the purpose of the examination can be attained by mere accumulation of courses in English. It will always be presupposed, however, that candidates presenting themselves for examination have an equivalent of 27 units of English to their credit.

### LOWER DIVISION COURSES.

#### 1. General Composition.

Fortnightly compositions in each of the prose forms in turn.

Regular appointments for individual criticism. Analysis of prose specimens. Impromptu writing in class once a fortnight. This course must precede Courses 2, 3A, and 3B, and the major courses.

#### 1A. Narration and Description.

Assistant Professors WELLS, FLAHERTY, and SPRAGUE,  
Dr. KURTZ, Mr. SMITHSON, Mr. —, and Readers.

3 hrs., first half-year. Ten sections. Sections I, II (Dr. KURTZ), M W F, 9, 10; Sections III, IV (Assistant Professor WELLS), M W F, 1, 2; Sections V, VI (Assistant Professor FLAHERTY), M W F, 9, 10; Section VII (Assistant Professor SPRAGUE), M W F, 9; Sections VIII, IX, X (Mr. SMITHSON), Tu Th S, 8, 10, 11; Sections XI, XII (Mr. —), Tu Th S, 8, 9.

#### 1B. Exposition.

Assistant Professors WELLS, FLAHERTY,  
and SPRAGUE, Dr. KURTZ, Mr. SMITHSON, Mr. —, and Readers.

3 hrs., second half-year. Sections as in the first half-year; save Section VI, for which see Course 1C.

#### 1C. The Foundations of Argumentative Writing.

Assistant Professor FLAHERTY and a Reader.

Principles, methods, and practice.

3 hrs., second half-year. One section, M W F, 10. Optional with 1B, but limited to students approved by the instructor.

**2. General History of English Literature.**

The development of English literature from the Beowulf to the death of Scott. An historical outline, supplemented by the study of representative masterpieces. Lectures, recitations, discussions, and written exercises. This course must precede major courses.

**2A. From the Beginnings to Milton.**

Assistant Professors ARMES and SANFORD, and Dr. KURTZ.

3 hrs., first half-year. Six sections. Section I, II (Assistant Professor SANFORD), Tu Th 8, 10, 11; Sections III, IV, V (Assistant Professor ARMES), M W F, 9, 2, 3; Section VI (Dr. KURTZ), M W F, 8.

**2B. From Milton to the Death of Scott.**

Assistant Professors ARMES and SANFORD, and Dr. KURTZ.

3 hrs., second half-year. Six sections, as in 2A.

**3A. Analysis of Argumentative Masterpieces.**

Assistant Professor FLAHERTY.

A careful inquiry into the methods of Burke, Webster, and other masters of debate, with study of the political principles involved in the subjects under discussion.

2 hrs., first half-year. M W, 11. Open to students after the Freshman year who have had 1c. Courses 3A and 3B are preliminary to 7A.

**3B. Analysis of Argumentative Masterpieces.**

Assistant Professor FLAHERTY.

Continuation of 3A.

2 hrs., second half-year. M W, 11.

**3C. Principles of Vocal Expression.**

Mr. VON NEUMAYER.

Technique of speech and delivery; oral reading.

2 hrs., first half-year. Two sections. Tu Th, 9, 10. Courses 3C and 3D are open to students of any year.

**3D. Principles of Vocal Expression.**

Mr. VON NEUMAYER.

Continuation of 3C.

2 hrs., second half-year. Two sections. Tu Th, 9, 10.

**\*4. Great Books.**

Professor GAYLEY and a Reader.

A discussion of certain foreign masterpieces in their bearing upon English literature. Lectures, reading, and reports. Since the discussion extends through four years, the course may be taken four times. Series A, second half-year 1903-04, and first half-year 1904-05, Books of Wisdom; Series B, second half-year 1904-05, and first half-year, 1905-06, Epics; Series C, 1906-07, Dramas and other Poems; Series D, Romances, or Biographies and Histories. In 1908-09, The Drama of Today.

1 hr., either half-year. F, 4. In the first half of each year this course is open to all students. In the second half it is limited to students in the colleges of applied science and Commerce, and such others as have the permission of the instructor. For similar courses in general literature students are referred to 16A, The Bible, and 17A, Shakespeare; also to Sanskrit 22 (The Sanskrit Drama in English), German 9 (German Literature in English), Slavic Literature 20, 21 (Russian Novelists, etc., in English), and Philosophy '4 (The principal ethical classics in English).

**\*5A. Scientific Prose.**

Mr. SMITHSON.

Analysis of masterpieces of scientific exposition. Practice in the collection and interpretation of material, and in oral and written composition.

2 hrs., both half-years. Tu Th, 8. Elective for students who have at least Sophomore standing. Especially adapted to the needs of students in the colleges of applied science and Commerce.

**UPPER DIVISION COURSES.†****FOR JUNIORS AND SENIORS.****ORAL AND WRITTEN COMPOSITION.****6A. Studies in Style. (Mj.)**

Dr. KURTZ.\*

Lectures and readings; intensive study of the personality and style of certain prose writers of the seventeenth and eighteenth centuries.

2 hrs., first half-year. Tu Th, 1. Or 3 hrs., for students who add exercises in rapid writing.

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\* Not to be given in 1907-08.

† Unless otherwise stated, Courses 1 and 2 are prerequisite.

**6B. Rapid Writing.** Assistant Professor WELLS and Dr. KURTZ.

For six weeks, the preparation of a single-page composition every day (except Saturday); after that, somewhat longer compositions thrice a week, twice a week, and finally once a week.

2 hrs., first half-year. Tu Th, 1. Two sections, each limited to twenty. Open without prerequisite to all students in the Upper Division, but applicants must obtain the consent of the instructor. Section I (Assistant Professor WELLS), Section II (Dr. KURTZ) under 6A.

**\*8A. Narrative Prose.** (Mj.) Assistant Professor HART.

2 hrs., either half-year. W, 8-10 p.m. Two sections. An advanced course in composition. Limited to students who have the consent of the instructor.

**8B. Narrative Prose.** (Mj.) Assistant Professor WELLS.

Weekly and fortnightly compositions, chiefly short stories; lectures and class conferences; individual appointments for criticism. Lectures identical with Course 9C.

3 hrs., second half-year. Tu Th, 1, and class conference Tu or Th, 2. Limited to twelve.

**8C. The Essay.** (Mj.) Dr. KURTZ.

An advanced course in the construction of essays in literary appreciation. Limited to twelve.

2 hrs., second half-year. W, 3-5.

SPEAKING AND DEBATING.

**3E. Oral Interpretation.** (Mj.) Mr. VON NEUMAYER.

The reading of English and American poetry and prose. Training in vocal expression. Intended especially for prospective teachers.

2 hrs., first half-year. Two sections. Tu Th, 1, 2.

**3F. Oral Interpretation.** (Mj.) Mr. VON NEUMAYER.

Continuation of 3E.

2 hrs., second half-year. Two sections. Tu Th, 1, 2.

**7A. Argumentation.** (Mj.) Assistant Professor FLAHERTY.

Preparation of briefs; presentation of arguments.

3 hrs., first half-year. Section I, debate W, 3-5; Section II, debate F 3-5; supervision of briefs by personal arrangement.

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\* Not to be given in 1907-08.

Prerequisite: Courses 1 and 2, and the permission of the instructor. Some preliminary training in vocal expression, and in Economics or Political Science, is advisable.

**7B. Forensics. (Mj.)** Assistant Professor FLAHERTY.

Practice in debating. Arguments concerning moot-questions in politics and economics.

3 hrs., second half-year. W, 3-5; supervision of briefs, —. Open only to students selected from the class in Argumentation.

**\*7C. Oral Debates upon Literary Topics. (Mj.)**

Professor GAYLEY.

Discussion of questions pertaining to six or eight plays of Shakespeare and as many recent dramas and romances. Training in the literary aspects of argumentative discourse, and in the fundamental principles of literary criticism.

3 hrs., first half-year. Discussion, M, 4-6; lectures in criticism, —. Open to students who have taken 7A and 7B. Limited to twelve.

**7D. Public Speaking.** Mr. VON NEUMAYER.

An introductory course in masterpieces of oratory. Intended for students who purpose specializing in this study.

2 hrs., first half-year. W F, 3. Open without prerequisite to all students in the Upper Division.

**7E. Public Speaking.** Mr. VON NEUMAYER.

Continuation of 7D. Declamations and extempore exercises based upon assigned topics in American history and current events.

2 hrs., second half-year. W F, 3. Open without prerequisite to all students in the Upper Division.

**7F. Reading and Recitation: Selected Dramas.**

Mr. VON NEUMAYER.

Analysis and oral interpretation of dramatic characters.

2 hrs., first half-year. Tu Th, 3. Prerequisite: Either 3C and 3D or 3E and 3F.

**7G. Reading and Recitation: Selected Dramas.**

Mr. VON NEUMAYER.

Continuation of 7F.

2 hrs., second half-year. Tu Th, 3.

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\* Not to be given in 1907-08.

## PRINCIPLES OF LITERATURE; INTERPRETATION AND CRITICISM.

**9A. The Theory of Poetry.** (Mj.)

Dr. KURTZ.

Lectures on poetry in its relation to the other arts. The history and technique of English verse. Reports on Aristotle's Poetics, and other masterpieces of literary theory; analysis of representative poems, ancient and modern. Fortnightly exercises in criticism.

3 hrs., second half-year. M W F, 2.

**\*9B. Problems in Literary Criticism.** (Mj.)

Professor GAYLEY and Dr. KURTZ.

The characteristics and development of literary types (chosen from lyric, ballad, idyl, epic, romance, and novel).

3 hrs., second half-year, 1908-09. M W F, 1. Courses 9A and 9B are given in alternate years.

**9C. The Art of Fiction: Theory and Reading.** (Mj.)

Assistant Professor WELLS.

An outline of the theory of narration, traced by lectures and by the study of representative masterpieces: autobiography, novel, and short-story. One such book to be read and reported on each week. The reports will be brief studies in critical exposition. Lectures identical with Course 8B.

2 hrs., second half-year. Tu Th, 1.

**10A. Interpretation: Logical and Literary.** (Mj.)

Professor BRADLEY.

Principles and methods; study of representative masterpieces; practical exercises, oral and written, with a view to training in composition and research.

3 hrs., first half-year. M W F, 2.

**\*10C. Translation.** (Mj.)

Professor BRADLEY.

Discussion of the factors and processes of interpretation involved; comparative study of representative specimens; practical exercises with a view to training in composition.

3 hrs., second half-year. M W F, 2.

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\* Not to be given in 1907-08.

## HISTORY OF THE LANGUAGE.

Students whose major is English as well as those who are candidates for the teacher's certificate must take 11A, or 14A, or 14D.

**11A. Old English.** (Mj.)

Assistant Professor HART and Mr. SMITHSON.

Grammar; reading of selected prose and poetry.

3 hrs., first half-year. Two sections. Section I, M W F, 9 (Assistant Professor HART); Section II, Tu Th S, 9 (Mr. SMITHSON).

**12A. Beowulf.** (Mj.)

Assistant Professor HART.

Lectures; interpretation; study of linguistic and literary topics with special reference to modern English.

3 hrs., second half-year. M W F, 9. Prerequisite: Course 11A.

**12B. Caedmon and Cynewulf.** (Mj.)

Mr. SMITHSON.

The reading of selections from the early Christian epics.

3 hrs., second half-year. Tu Th S, 9. Prerequisite: Course 11A.

**13A. Middle English.** (Mj.)

Assistant Professor NOYES.

Phonology and grammar. Relations to Old and Modern English. Linguistic study of selections from English literature from 1200 to the time of Chaucer.

3 hrs., first half-year. M W F, 9. Prerequisite: Course 11A.

**14A. History of the English Language.** (Mj.)

Professor BRADLEY.

A general survey of the origin and growth of the English tongue, with special reference to phonology and accidence. Open to students who do not desire to take 11A, as well as to those who take it. Especially adapted to the needs of prospective teachers.

3 hrs., second half-year. M W F, 3.

**\*14C. Shakespeare's English.** (Mj.) Assistant Professor HART.

A careful inquiry into the language of two or three plays. Studies in English semantics.

3 hrs., first half-year. M W F, 10. Prerequisite: Permission of instructor. This course alternates with 17D.

**\*14D. Introduction to English Grammar.** (Mj.)

Lectures, with collateral study.

Professor BRADLEY.

3 hrs., first half-year. M W F, 8. A general acquaintance with at least two languages other than modern English is requisite.

\* Not to be given in 1907-08.



## HISTORICAL AND CRITICAL STUDY OF THE LITERATURE.

**13B. Chaucer.** (Mj.)

Assistant Professor HART.

The narrative art of Chaucer as exemplified in the *Canterbury Tales*; the life of his times. Reading; interpretation; reports and theses.

3 hrs., second half-year. M W F, 10.

**\*13C. English and Scottish Popular Ballads.** (Mj.)

Assistant Professor HART.

The ballad as a literary type; its relation to the epic and primitive poetry; theories of the beginnings of poetry. Lectures, reports, and theses.

3 hrs., second half-year. M W F, 10.

**15A. Elizabethan Poetry.** (Mj.)

Assistant Professor SANFORD.

Lectures on the development of lyric, pastoral, sonnet, madrigal, ode, elegy, and epithalamium (1550-1660) from their classical and renaissance sources. Readings and reports. Course 15 alternates with 19.

3 hrs., first half-year. Tu Th S, 9.

**15B. Spenser.** (Mj.)

Assistant Professor SANFORD.

The development of the literary epic in Virgil, Dante, Ariosto, and Tasso, with special reference to Spenser's *Faerie Queene*.

3 hrs., second half-year. Tu Th S, 9.

**\*16A. The Bible.**

Professor GAYLEY and a Reader.

Introduction to the literary study of the Bible in English. Lectures; readings and written reports.

1 hr., first half-year. F, 2. Open without prerequisite to all students in the Upper Division.

**\*16B. The Bible in English Literature.** (Mj.)

Professor GAYLEY and a Reader.

Qualities of literary form and style; careful study of selected books; influence upon English authors.

3 hrs., first half-year. M W F, 2. This course includes 16A, but demands as prerequisite Courses 1 and 2.

**\*17A. Shakespeare.**

Professor GAYLEY and a Reader.

A general course of lectures, accompanied by reading on the part of the class, and reports.

1 hr., second half-year. F, 2. Open without prerequisite to all students in the Upper Division.

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\* Not to be given in 1907-08.

**\*17B. Elizabethan Dramatists. (Mj.)**

Professor GAYLEY and a Reader.

Lectures, historical and critical; reading and discussion of representative plays; oral and written exercises by the class.

3 hrs., second half-year. M W F, 2. This course includes 17A, but demands as prerequisite Courses 1 and 2.

**\*17C. Shakespeare Seminar. (Mj. )**

Professor GAYLEY.

Shakespeare's relation to his contemporaries; the development of his art. Historical and literary criticism of selected works.

2 hrs., second half-year. M, 4-6. Open only to Seniors whose major is English and who are taking Course 17B, and to graduates.

**17D. Textual Studies in Shakespeare. (Mj.)**

Assistant Professor HART.

A careful inquiry into the textual history and the language of two or three plays. This course may be taken in two successive years. In 1905-06 were read *King Lear* and *Henry IV, Part I*. In 1906-07 were read *Macbeth*, *Henry IV, Part II*, and *Twelfth Night*. In 1907-08 will be read *Hamlet*.

3 hrs., first half-year. M W F, 10. This course alternates with 14C.

**18A. Milton. (Mj.)**

Professor BRADLEY.

His life and times. Lectures, with reading of his English poems.

3 hrs., first half-year. M W F, 3. Open without prerequisite to all students in the Upper Division.

**\*18B. Milton. (Mj.)**

Professor BRADLEY.

Study of special problems in connection with his poems.

3 hrs., second half-year. M W F, 3.

**\*19A. The Age of Dryden. (Mj.)** Assistant Professor SANFORD.

3 hrs., first half-year. Tu Th S, 9 (1908-09). Course 19 alternates with 15.

**\*19B. The Age of Pope. (Mj.)** Assistant Professor SANFORD.

3 hrs., second half-year. Tu Th S, 9 (1908-09).

\* Not to be given in 1907-08.

**\*21A. History of Poetry in the Nineteenth Century. (Mj.)**

Professor GAYLEY and a Reader.

Lectures; readings and reports.

3 hrs., first half-year. M W F, 2. Fortnightly written exercises.

**21B. Poems of the Nineteenth Century. (Mj.)**

Professor BRADLEY.

Intensive study of masterpieces selected from Wordsworth, Byron, Shelley, Fitzgerald, Tennyson, Arnold, Browning, Rossetti, Swinburne, or other poets.

3 hrs., second half-year. M W F, 2.

**22A. The History of American Literature. (Mj.)**

Assistant Professor ARMES.

A general view, illustrated by copious reading; lectures, reports, discussions, and papers.

3 hrs., first half-year. M W F, 10. Open without prerequisite to all students in the Upper Division.

**22B. American Authors. (Mj.)**

Assistant Professor ARMES.

Intensive study of special authors.

3 hrs., second half-year. M W F, 10.

**\*23. Representative Essayists. Seminar (Mj.)**

In 1908-09, Courses 23c (Emerson) and 23d (Ruskin) will be given. In 1906-07, the following were given:

**23A. Arnold. (Mj.)**

Professor BRADLEY.

3 hrs., first half-year. M W F, 3. Open to Seniors and graduates.

**23B. Carlyle. (Mj.)**

Professor BRADLEY.

3 hrs., second half-year. M W F, 3. Same conditions as 23A.

**GRADUATE COURSES.****30. The Principles of Linguistics.**

Professor BRADLEY.

Studies in Paul, Brugmann, Wundt, and others, with special application to the English language.

3 hrs., throughout the year. Open to students who have the requisite equipment and training.

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\* Not to be given in 1907-08.

- \*39. Seminar in English Literary History.** Professor GAYLEY.  
The careful investigation of problems in the development of English comedy, or in the history of criticism in England.  
3 hrs., throughout the year. W, 3-5. (To be given in 1908-09).
- \*40. The History of Aesthetic.** Professor GAYLEY.  
From a study at first hand of the principal authorities.  
3 hrs., first half-year. W, 3-5. This course should be preceded by Course 9A or 9B.
- \*41. Seminar in the Comparative Study of Literature.** Professor GAYLEY.  
History and methods of the study: the application of principles in the investigation of an author, a theme, a movement, or a type.  
3 hrs., second half-year. W, 3-5. Prerequisite: Courses 9 and either 39 or 40, and a sufficient knowledge of the classics and the modern languages.
- 42. Seminar in the Comparative Study of Literature.** Assistant Professor HART.  
Investigation of special problems in the technique of the ballad, epic, metrical romance, etc.  
3 hrs., throughout the year. M W F, 11.
- 44. The Revolt Against Classicism; The Romantic Renaissance: Seminar.** Assistant Professor SANFORD.  
The romantic, naturalistic, and sentimental movement in England in the eighteenth and nineteenth centuries, with reference to the similar movement on the Continent.  
3 hrs., throughout the year, to be determined after consultation. Prerequisite: A sufficient acquaintance with the French and German languages and literatures.
- 50. Special Study.**  
The instructors in English hold themselves ready to assist and advise competent students who may propose plans of special study which meet the approval of the department.

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\* Not to be given in 1907-08.

SPECIALLY FOR PROSPECTIVE TEACHERS.

**\*52. Seminar in Advanced Rhetorical Analysis.**

Professor BRADLEY.

3 hrs., second half-year. Hours to be arranged.

**53. The Teaching of Literature and Composition.**

Assistant Professor WELLS.

The organization of the high school course in English; the correlation of literature and composition; practice in composition and in correcting compositions.

2 hrs., first half-year. Tu Th, 2.

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\* Not to be given in 1907-08.

**GERMANIC PHILOLOGY.**

For the courses in English and German Philology see the department announcements.

**UPPER DIVISION COURSES.**

1. **Gothic.** Professor SCHILLING.  
Grammar, with special reference to the other Germanic dialects.  
Reading.  
3 hrs., first half-year. Prerequisite: Three years of German, and either German 7 or English 11A (Old English):
- \*2. **Norse Mythology.**  
Lectures and topical study.  
2 hrs., second half-year. M W, 11.

**GRADUATE COURSES.**

3. **Introduction to Germanic Philology.** Professor SCHILLING.  
The Indo-Germanic Race, its history, and the phonology of its languages. The Germanic sound-shifting and the phonological development of the Germanic dialects.  
1 hr., first half-year.
- \*4. **Old Norse.**  
Outlines of the grammar; readings. The linguistic and literary relations of Old Norse to English.  
2 hrs., throughout the year. Prerequisite: Some knowledge of Old English and Gothic.
- \*5. **Germanic Antiquities.** Professor SCHILLING.  
The prehistoric culture of the Indo-Germanic race. Caesar's account of the Germans; the Germania and the Annals of Tacitus. The private, political, legal, and military antiquities of the Germanic peoples in the middle ages.

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\* Not to be given in 1907-08.

**GERMAN.**

HUGO K. SCHILLING, Ph.D., Professor of the German Language and Literature.

ALBIN PUTZKER, M.A., Honorary Professor and Lecturer in German Literature.

J. HENRY SENDER, Ph.D., Associate Professor of German.

LUDWIG J. DEMETER, M.A., Assistant Professor of German.

CLARENCE PASCHALL, M.A., Instructor in German.

W. R. RICHARD PINGER, M.A., Instructor in German.

— — —, Instructor in German.

MICHAEL ONGERTH, Grad. Theol., Assistant in German.

— — —, Reader in German.

Students who wish to make a special study of German literature are advised to acquire a reading knowledge of French and a general knowledge of the history of philosophy. In the graduate courses some knowledge of Greek is highly desirable.

**Teachers' Certificates.** Students who desire the teachers' certificate should do not less than twenty units of Upper Division work in German, including German 6A, 6B, 6C, 7, 18, and 21A, and are urgently advised to take also Course 12. The recommendation for the certificate is not, however, given in course, but only for high scholarship and general proficiency in German, as judged by the department on the basis of the applicant's University record and a special oral and written examination.

**LOWER DIVISION COURSES.****A. Elementary German.**

Associate Professor SENDER,

Mr. PASCHALL, Mr. PINGER, and Mr. —.

The essentials of grammar; reading of modern prose; translation into German; reading at sight; conversation.

3 hrs., throughout the year. M W F, 8, 9, 10, 1; Tu Th S, 8, 9.

This course is intended as an equivalent for matriculation subject 15b<sup>2</sup>. Prescribed for Freshmen entering the College of Chemistry in August.

**A<sup>2</sup>. Elementary German.**

Mr. PINGER.

5 hrs., second half-year. M Tu W Th F, 1.

This course is identical, in subject matter and scope, with Course A and with the first half of Course AB. It is intended mainly for students entering the University at the beginning of the second half-year, and is prescribed for those entering the College of Chemistry at that time; but it may also be taken by others, as an equivalent for German A or matriculation subject 15b<sup>2</sup>.

**AB. Elementary German. (Double Course.)**

Mr. PINGER.

Grammar, including syntax; reading of modern prose and poetry and of one of Schiller's dramas; composition; reading at sight; conversation.

5 hrs., throughout the year. M Tu W Th F, 2.

This course combines the work of Courses A and B, and is intended for beginners who wish to prepare, in one year, for the advanced courses in German, or to acquire a reading knowledge of the language sufficient for use in other studies.

**B. Modern Stories and Plays.**

Mr. PASCHALL, Mr. PINGER, and Mr. —.

Selections from prose and poetry, including one of Schiller's dramas; grammar and composition; reading at sight; conversation. The course is conducted mainly in German. It is intended as an equivalent for matriculation subjects 15b<sup>3</sup> and 15b<sup>4</sup>.

3 hrs., throughout the year. M W F, 8, 9, 1; Tu Th S, 8, 9. Prerequisite: Course A (or A<sup>2</sup>) or credit in matriculation subject 15b<sup>2</sup>.

**3. German Prose.**

Associate Professor SENER.

Subjects in the sciences, history, and economics; journalistic German. Special reading assigned to students in connection with their courses. Constant practice in composition and reading at sight.

3 hrs., throughout the year. M W F, 10. Prerequisite: Course A (or A<sup>2</sup>) or credit in matriculation subject 15b<sup>2</sup>. Prescribed, Sophomore year, in the College of Chemistry.

Course B is the regular Sophomore course leading up to the advanced courses in German. Course 3 provides special training in the reading of more or less technical texts. Students



who have had Course 3 may, however, take Course 6A; and they may be admitted to Course 4, 5, or 8, if they take at the same time Course 6A or satisfy the department that they are not deficient in grammar and composition.

For students who have taken or are taking either of Courses B and 3, the other counts as four units only.

#### 9. Outlines of the History of German Literature.

Professor SCHILLING.

Lectures and collateral reading of representative works (in English translations).

1 hr., throughout the year. Tu, 4.

This course is open to students in all departments of the University, as a free elective, and does not require a knowledge of German. It is not intended for those who pursue the study of German beyond Courses 4, 5, and 8; no student will receive credit for both German 9 and German 18.

#### UPPER DIVISION COURSES.

The courses in this group (except Course 21, and Germanic Philology 1) are conducted in German.

Either Course 4, or 5, or 8 is prerequisite to Courses 18, 7, 13, 10, and 11; one of Courses 18, 7, 12, 13, 10, or 11 is prerequisite to Courses 14A-B, 15A-B, 16A-B, 20A-B, 22, and 23.

#### 4. Classics of the Eighteenth Century: Schiller.

Associate Professor SENGER.

Schiller's principal dramas, and selections from his prose writings; Lessing's *Minna von Barnhelm* and *Emilia Galotti*; Goethe's *Egmont* or *Iphigenie*, and *Hermann und Dorothea*. Lectures on the life and times of Schiller, with collateral reading. Practice in composition.

3 hrs., throughout the year. M W F, 1. Prerequisite: Course AB or B, or credit in matriculation subject 15b<sup>s</sup> (Intermediate German); or, conditionally, Course 3.

#### 5. Classics of the Eighteenth Century: Lessing.

Mr. —.

Lessing's principal dramas; Schiller's *Wallensteins Lager* and *Wallensteins Tod*; Goethe's *Egmont* or *Iphigenie*, and *Hermann und Dorothea*. Lectures on the life and times of Lessing, with collateral reading. Practice in composition.

3 hrs., throughout the year. M W F, 2. Prerequisite: Same as for Course 4.

**8. Classics of the Eighteenth Century: Goethe.**

Assistant Professor DEMETER.

Goethe's principal dramas, and *Hermann und Dorothea*; Schiller's *Wallensteins Lager* and *Wallensteins Tod*; Lessing's *Minna von Barnhelm* and *Emilia Galotti*. Lectures on the life and times of Goethe, with collateral reading. Practice in composition.

3 hrs., throughout the year. M W F, 8. Prerequisite: Same as for Course 4.

For students who have taken or are taking one of the three Courses 4, 5, 8, either of the other two counts as four units only.

**6A. Grammar, Composition, and Conversation. First Course.**

Assistant Professor DEMETER.

2 hrs., throughout the year. Section I, Tu Th, 11; Section II, Tu Th, 1. Prerequisite: Same as for Course 4.

**6B. Grammar, Composition, and Conversation. Second Course.**

Assistant Professor DEMETER.

2 hrs., throughout the year. Tu Th, 10. Prerequisite: First or second grade of scholarship in Course 6A.

**6C. Composition. Third Course.** Assistant Professor DEMETER.

Themes and Essays. Practice in the correcting of written exercises. One conference a week with each student, at an hour to be appointed by the instructor. Prerequisite: First or second grade of scholarship in Course 6B.

**18. General History of German Literature.** Professor SCHILLING.

First half-year, the Middle Ages; second half-year, from the Reformation to the death of Goethe. Lectures and discussions; collateral reading; essays.

3 hrs., throughout the year. M W F, 2. With the permission of the instructor, either half may be taken separately. Prerequisite: Course 4, 5, or 8.

**7. Middle High German.**

Assistant Professor DEMETER.

Outlines of grammar, with special reference to the development of modern German. Selections from the *Nibelungenlied*, the *Kudrun*, and the epics of chivalry. Translation into modern German.

3 hrs., first half-year. M W F, 9. Prerequisite: Course 4, 5, or 8.

12. **Outlines of the History of the German Language. Elementary Course.** Mr. PASCHALL.  
3 hrs., second half-year. M W F, 9. Prerequisite: Course 7.
13. **The German Folk-song.** Professor SCHILLING.  
A study of the history of German folk-poetry from the Middle Ages to the present. Lectures, reading, and essays.  
1 hr., throughout the year. Th, 3. Prerequisite: Course 4, 5, or 8.
10. **Poets of the Nineteenth Century.** Professor PUTZKER.  
The development of poetry as an expression of the spirit of the times. Lectures and essays.  
2 hrs., throughout the year. Tu Th, 9. Prerequisite: Course 4, 5, or 8.
11. **The German Novel in the Nineteenth Century.** Professor PUTZKER.  
2 hrs., throughout the year. Tu Th, 10. Prerequisite: Course 4, 5, or 8.
- 21A. **German Phonology and Orthography.** Assistant Professor DEMETER.  
1 hr., first half-year. Tu, 3.
- 21B. **The Teaching of German.** Assistant Professor DEMETER.  
A course in methods, text-books, and teachers' aids, with practical demonstrations and visiting of schools. Collateral reading and reports.  
1 hr., second half-year. Tu, 3.
- \*14A. **Schiller's Lyrics, Ballads, and Philosophical Poems.** Professor PUTZKER.  
A critical study of Schiller's style and methods; lectures, reading, and reports on assigned work.  
3 hrs., first half-year. M W F, 9. Prerequisite: Course 18, 7, 10, 11, 12, or 13.
- \*14B. **Schiller's Dramas in the Light of His Aesthetical and Critical Writings.** Professor SCHILLING.  
2 hrs., second half-year. Tu Th, 2.
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- \* Not to be given in 1907-08.

- 15A. The Romantic School.** Associate Professor SENER.  
 I. The Schlegels, Novalis, Tieck, Schleiermacher, Fichte.  
 3 hrs., first half-year. M W, 11; Th, 1. Prerequisite: Course 18,  
 7, 10, 11, 12, or 13.
- 15B. The Romantic School.** Associate Professor SENER.  
 II. Brentano, Arnim, Fouqué, Eichendorff, Heine.  
 3 hrs., second half-year. M W, 11; Th, 1. Prerequisite: Course  
 18, 7, 10, 11, 12, or 13.
- \*16A. The German Drama in the Nineteenth Century.**  
 Associate Professor SENER.  
 I. Kleist, Grillparzer, Immermann, Mosen, Halm.  
 3 hrs., first half-year. M W, 11; Th, 1. Prerequisite: Course 18,  
 7, 10, 11, 12, or 13.
- \*16B. The German Drama in the Nineteenth Century.**  
 Associate Professor SENER.  
 II. Hebbel, Ludwig, Geibel, Freytag, Heyse.  
 3 hrs., second half-year. M W, 11; Th, 1. Prerequisite: Course  
 18, 7, 10, 11, 12, or 13.
- 20A. The Life and Works of Lenau.** Professor PUTZKER.  
 3 hrs., first half-year. M W F, 10. Prerequisite: Course 18, 7,  
 10, 11, 12, or 13.
- 20B. The Life and Works of Chamisso.** Professor PUTZKER.  
 3 hrs., second half-year. M W F, 10. Prerequisite: Course 18,  
 7, 10, 11, 12, or 13.
- 22. The Faust Legend and Goethe's Faust.** Professor SCHILLING.  
 2 hrs., throughout the year. Tu Th, 2. Prerequisite: Course 18,  
 7, 10, 11, 12, or 13.
- \*23. The Poems of Goethe.** Professor SCHILLING.  
 2 hrs., second half-year. Tu Th, 2.
- Gothic: Grammar and Reading.** [See Germanic Philology 1, p. 92.]  
 Professor SCHILLING.

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\* Not to be given in 1907-08.

## GRADUATE COURSES.

**Introduction to Germanic Philology.** [See Germanic Philology 3, p. 92.]  
Professor SCHILLING.

**\*19. Old Saxon. Outlines of Germanic Metrics.**

Professor SCHILLING.

3 hrs., second half-year.

**\*17. Old High German.**

Professor SCHILLING.

3 hrs., first half-year.

**\*28. Historical Grammar of the German Language: Middle High German and Modern German.**

Professor SCHILLING.

3 hrs., second half-year.

**\*24. German Literature in the Sixteenth Century.**

Associate Professor SENGEL.

1 hr., throughout the year.

**26. The Works of Hölderlin. Seminar.**

Associate Professor SENGEL.

1 hr., throughout the year.

**\*25. The Principles of Dramaturgy: Lessing's Hamburgische Dramaturgie and the Theories of the Present Day.**

Professor PUTZKER.

1 hr., throughout the year.

**29. Herder and His Influence upon Goethe.**

Professor PUTZKER.

1 hr., throughout the year.

**27. German Poetry During the Decadence of Chivalry.**

Professor SCHILLING.

Ulrich von Lichtenstein, Neidhart von Reuenthal, der Tannhäuser, der Stricker, Werner der Gärtner.

3 hrs., second half-year.

**\*Germanic Antiquities.** [See Germanic Philology 5, p. 92.]

Professor SCHILLING.

**30. Germanic Seminar.**

Professor SCHILLING.

Original investigation in linguistic and literary fields chosen with regard to the needs and wishes of each student. S, 8:30.

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\* Not to be given in 1907-08.

**ROMANIC LANGUAGES.**

SAMUEL A. CHAMBERS, M.A., Assistant Professor of French.

JOHN T. CLARK, Ph.D., Assistant Professor of Romanic Languages.

ROBERT DUPOUEY, Agrégé ès Lettres de l'Université de Paris, Assistant Professor of French.

CHARLES H. HOWARD, M.A., Instructor in French.

GUSTAVE FAUCHEUX, B.ès Sc., Instructor in French.

CARLOS BRANSBY, M.A., Litt.D., Instructor in Spanish.

JOHN A. CHILD, A.B., Instructor in Italian.

EMMANUEL B. LAMARE, Instructor in French.

ALFRED SOLOMON, M.A., Assistant in French.

**University Credit.** Students who enter the University with credit in one or more of the matriculation subjects 15a<sup>1</sup>, 15a<sup>2</sup>, 15a<sup>3</sup>, 15a<sup>4</sup>, 15c, and who do satisfactory work in continuation of these subjects in the University, are given University credit, usually on the basis of three units of University work for one unit of preparatory work; but no University credit is given for subjects used for matriculation.

Students from accredited schools who do not continue their work in this department, and those who enter with some knowledge of Romanic languages not acquired in an accredited school, are obliged to take an examination in order to obtain University credit. Application for such an examination should be made at the time of entrance to the University.

Credit for the advanced courses is given only upon the basis of work regularly and satisfactorily performed in some university of good standing.

**Teacher's Certificate.** A final examination both oral and written is required of each candidate on his ability to read, write, and speak the language for which he requests the certificate. He must satisfy the Department that he has:

1. Ability to read the language aloud with correct pronunciation and proper phrasing.
2. A knowledge of the elements of phonetics, especially for French.
3. The ability to understand the language when spoken, to carry on in it a simple conversation and to write it easily with grammatical correctness.

(The speaking and writing vocabulary should be that of daily life; the reading vocabulary should be sufficient to enable the candidate to read the ordinary language with ease.)

4. A general knowledge of the literature and a special knowledge of some author, period or literary form.

5. A knowledge of the problems of modern language teaching; the recent attempts to solve them; definite ideas as to the teaching of the various phases of the subject, such as *Pronunciation, Grammar, Speaking*.

A knowledge of the history of the country to which the language belongs, especially the history of its civilization, is advisable.

The candidate is supposed to have six units of Junior and twelve units of Senior work, but it must be understood that the certificate is given only for scholarship and ability to teach the language.

**Honors.** Provision has been made for graduation with honors in French, Italian, Spanish, or Romanic Philology. Consult the head of the Department for information.

**Clubs.** The *Cercle Français*, the *Círculo Hispánico*, and the *Circolo Italiano* meet separately about every two weeks and afford excellent opportunities to hear and to speak the Romanic languages.

The *Romanic Club* is composed of the members of the Department and of advanced graduate students. It meets once a month for the discussion of the latest journals and books dealing with Romanic topics.

**Public Lectures** in French are given on Tuesdays, at 4 p.m., each week.

**To other Departments.** This department is desirous of emphasizing the practical value of foreign languages. Therefore it wishes to encourage their use in research work. Books are assigned in all language courses to be read outside of class, and it is preferred that this be done, if possible, in connection with the student's specialty. If members of other departments will indicate French, Spanish, or Italian books to their students, the Department of Romanic Languages will give to such students all possible help and encouragement.

**General Statement.** The Romanic Languages are taught as living languages, the aim of the instruction being to enable the student to read and write them with fluency, as well as to gain a knowledge of the several literatures and the main problems connected with their development. A persistent attempt is made also toward the acquiring of speaking power.

**FRENCH.****LOWER DIVISION COURSES.****A. PRIMARILY FOR FRESHMEN.**

During the first year there is a careful study of grammatical forms and the essentials of syntax. Stress is laid throughout upon the acquisition of an exact pronunciation. From the very beginning an effort is made to lead the student to understand the spoken language and to express himself in it orally and in writing.

**A. First-year French.** Assistant Professor CLARK, Mr. HOWARD,  
Mr. LAMARE, and Mr. SOLOMON.

Grammar; easy short stories and plays by modern authors.

3 hrs., throughout the year. Eight sections. Section I, M W F, 8; Section II, M W F, 10; Section III, M W F, 1; Section IV, M W F, 2; Section V, M W F, 9; Section VI, Tu Th S, 8; Section VII, Tu Th S, 9; Section VIII, Tu Th S, 10.

This course is intended as an equivalent for matriculation subject 15a<sup>2</sup>.

**B. PRIMARILY FOR SOPHOMORES.**

During the second year the texts read are explained in the language studied. There is abundant practice in speaking and writing, based chiefly upon the text. These courses include also a further study of syntax. One-third of the time is given to the writing of French.

**B. Second-year French.** Assistant Professor CHAMBERS,  
Mr. HOWARD, Mr. FAUCHEUX, Mr. LAMARE, and Mr. SOLOMON.

The reading of contemporary French prose, some comedy, and some verse. Supplementary reading outside of the class.

3 hrs., throughout the year. Six sections. Section I, Tu Th S, 11; Section II, M W F, 9; Section III, M W F, 10; Section IV, M W F, 1; Section V, Tu Th S, 8; Section VI, M W F, 8.

This course is intended as an equivalent for matriculation subjects 15a<sup>3</sup> and 15a<sup>4</sup>.



## UPPER DIVISION COURSES.

## A. PRIMARILY FOR JUNIORS.

These courses are intended to be a complete preparation for the Senior work; they are to perfect the student in the use of the language. Accordingly, great stress is laid on reading aloud, on composition, and on original writing. Readers are attached to the courses to give individual attention to the student in his diction, both oral and written. Texts are read with literary appreciation of both work and author, but there is no attempt at systematic literature. The courses are given, as far as possible, in the foreign language. Students who receive third grades in Junior courses should continue in these courses until their language work is satisfactory, even if they take Senior work at the same time.

**6. French Speaking.**

Mr. LAMARE.

This course is established primarily for applicants for the teacher's certificate. It is open to others who want spoken French for a definite purpose. Consent of the instructor must be obtained.

3 hrs., throughout the year; 2 units.

**4C. Modern French.** Assistant Professors CLARK and DUPOUEY,  
Mr. FAUCHEUX, and Mr. CHILD.

Writers of the Romantic School, such as Victor Hugo, Musset, George Sand.

3 hrs., first half-year. Four sections. Section I, M W F, 1; Section II, M W F, 2; Section III, Tu Th S, 9; Section IV, Tu Th S, 8.

**4D. Modern French.** Assistant Professors CLARK and DUPOUEY,  
Mr. FAUCHEUX, and Mr. CHILD.

Writers of the Realistic School and recent writers, such as Balzac, Flaubert, Anatole France.

3 hrs., second half-year. Four sections. Section I, M W F, 1; Section II, M W F, 2; Section III, Tu Th S, 9; Section IV, Tu Th S, 8.

## B. PRIMARILY FOR SENIORS.

The aim of the courses in this group is to afford as complete a study as possible of a type, movement, or period. They are given in the languages studied and the work of the class takes the form

of reading, reports, themes, and discussion, with lectures by the instructor.

**7. History of French Literature.** Assistant Professor CHAMBERS.

A study of the great writers and great books of French literature; the minor writers and the literary movements are dealt with in lectures by the instructor. A short manual is used as a basis. The medieval period is treated briefly, the main study being upon the literature from the seventeenth century to the present time.

3 hrs., first half-year. M W F, 9.

**18A. French Lyric Poetry.** Assistant Professor DUPOUEY.

This course is devoted to the representative poets of the nineteenth century, such as Victor Hugo, Gautier, Leconte de Lisle, Verlaine.

2 hrs., first half-year. Tu Th, 2.

**18B. French Lyric Poetry.** Assistant Professor DUPOUEY.

A continuation of Course 18A.

2 hrs., second half-year. Tu Th, 2.

**19. French Fiction.** Assistant Professor CHAMBERS.

A general account of the history of romance and tale from the beginning to the present time with a special study of the short story.

2 hrs., first half-year. Tu Th, 10.

**20A. French Comedy.** Mr. FAUCHEUX.

A special study of Molière with an account of his predecessors and successors.

2 hrs., first half-year. M F, 10.

**20B. French Tragedy.** Mr. FAUCHEUX.

The origins of French tragedy and a study of Corneille, Racine, and Voltaire.

2 hrs., second half-year. M F, 10.

**5A. The Eighteenth Century.** Assistant Professor DUPOUEY.

The representative authors of the century, such as Montesquieu, Diderot, Voltaire.

2 hrs., first half-year. M F, 2.

**5B. The Eighteenth Century.** Assistant Professor DUPOUEY.

Jean-Jacques Rousseau and contemporaries.

2 hrs., second half-year. M F, 2.

**17. The Sixteenth Century.**

Mr. FAUCHEUX.

The literature of the Renaissance and the beginnings of classicism.

1 hr., throughout the year. W, 10.

**\*22. Classic French.**

The representative authors of the seventeenth century, such as Pascal, La Rouchefaucauld, La Fontaine, and Bossuet.

2 hrs., throughout the year.

**24. French Lectures.**

Assistant Professor DUPOUEY.

Histoire de la Société Française de 1801 à nos jours. On Tuesdays there is a lecture in French, open to the public; on Thursdays, a discussion of Tuesday's lecture, open only to students.

2 hrs., throughout the year. Tu Th, 4.

**29. Special Study.**

The instructors in Romanic Languages hold themselves ready to advise and assist students who may propose plans of special study.

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**SPANISH.**

(See introduction to the corresponding division in French.)

**LOWER DIVISION COURSES.**

**A. First-year Spanish.**

Mr. HOWARD and Dr. BRANSBY.

Elements of Spanish grammar. Easy short stories and plays.

3 hrs., throughout the year. Four sections. Section I, Tu Th S, 8; Section II, Tu Th S, 9; Section III, M W F, 1; Section IV, M W F, 9.

This course is intended as an equivalent for matriculation subject 15c.

**B. Second-year Spanish.**

Mr. HOWARD and Dr. BRANSBY.

Advanced grammar. Modern Spanish novels and plays, and some verse. Reading outside of class.

3 hrs., throughout the year. Two sections. Section I, M W F, 8; Section II, Tu Th S, 9.

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\* Not to be given in 1907-08.

## UPPER DIVISION COURSES.

## A. PRIMARILY FOR JUNIORS.

- 4A. **Modern Spanish.** Assistant Professor CLARK.  
Reading of novel, drama, and poetry; of poets, probably Becquer or Espronceda will be read.  
3 hrs., first half-year. Tu Th S, 9.
- 4B. **Modern Spanish.** Assistant Professor CLARK.  
Novel and drama. One poet will be read, probably Camposamor or Nuñez de Arce.  
3 hrs., second half-year. Tu Th S, 9.
6. **Spanish Speaking and Writing.** Dr. BRANSBY.  
This course is organized especially for applicants for the teacher's certificate. It is open to others who want spoken Spanish for a definite purpose. Consent of the instructor must be obtained.  
3 hrs., throughout the year; 2 units.

## B. PRIMARILY FOR SENIORS.

- 7A. **History of Spanish Literature.** Assistant Professor CLARK.  
The principal writers, works, and literary movements from the earliest monuments to Cervantes. Weekly lecture in Spanish. Much collateral reading with reports and theses.  
3 hrs., first half-year. M W F, 9.
- 7B. **History of Spanish Literature.** Assistant Professor CLARK.  
A continuation of Course 7A covering the period from Cervantes to the present time.  
3 hrs., second half-year. M W F, 9.
- \*6A. **The Novela of the Golden Age.** Dr. BRANSBY.  
An account of the chivalresque and the picaresque novel with a special study of Cervantes.  
3 hrs., first half-year.
- \*6B. **The Drama of the Golden Age.** Dr. BRANSBY.  
An account of the drama of the epoch with especial attention to Lope de Vega, Calderón, and Tirso de Molina.  
3 hrs., second half-year.

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\* Not to be given in 1907-08.

**8A. Modern Spanish Fiction.**

Dr. BRANSBY.

Lectures in Spanish by the instructor on the novels and novelists of the last hundred years. Reading, discussion, reports, and theses by the class. Alarcón, Valdés, Galdós, Valera.

3 hrs., first half-year. M W F, 2.

**8B. Modern Spanish Drama.**

Dr. BRANSBY.

An account of the drama of the last hundred years. Zorrilla, Tamayo y Baus, Bretón de los Herreros, Echegaray.

3 hrs., second half-year. M W F, 2.

**29. Special Study.** [See French 29, p. 105.]

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**ITALIAN.**

(See introduction to the corresponding division in French.)

**LOWER DIVISION COURSES.**

**1. First-year Italian.**

Mr. CHILD.

Essentials of Grammar. Short stories by contemporary writers.

3 hrs., throughout the year. M W F, 2.

**2. Second-year Italian.**

Mr. CHILD.

A careful review of Italian syntax. Reading of modern authors.

3 hrs., throughout the year. M W F, 3.

**UPPER DIVISION COURSES.**

**4. The Literature of the Renaissance.**

Mr. CHILD.

Macchiavelli, Benvenuto Cellini, Ariosto, Tasso.

3 hrs., throughout the year. Tu Th S, 10.

**8A. Dante in English.**

Mr. CHILD.

Lectures on the life and times of Dante. Reading of the New Life and the Inferno. No knowledge of Italian is required.

3 hrs., first half-year. M W F, 10.

**8B. Dante in English.**

Mr. CHILD.

Reading of the Purgatory and the Paradise.

3 hrs., second half-year. M W F, 10.

**29. Special Study.**

Courses in advanced literary study, especially in Dante, Petrarch, and Boccaccio are arranged by conference for students desiring such guidance.

**ROMANIC PHILOLOGY.****GRADUATE COURSES.****25. Old French.****Mr. FAUCHEUX.**

The object of this course is the reading of Old French literature; consequently, more attention is paid to morphology and syntax than to phonetics. Reading: *Chanson de Roland*, *Chrétien de Troyes*; *Chevalier au Lion*. For graduates and Seniors.

2 hrs., throughout the year.

**28. Romanic Seminar.****THE DEPARTMENT.**

Special work for graduate students in French, Spanish, Italian, and Romanic Philology. The work is supervised by the member of the department in whose specialty it lies. Credit is given in accordance with the work done.

**3A. The Teaching of Modern Languages.****Assistant Professor CHAMBERS.**

A study of the methods, text-books, and materials that are used in elementary instruction. Lectures, readings, reports. Required of all applicants for teacher's certificate in French, Spanish, or Italian.

1 hr., first half-year.

**3B. French Phonetics.****Mr. HOWARD.**

A study of French pronunciation and the method of teaching it. Required of all candidates for the teacher's certificate in French.

1 hr., second half-year.

**26. Studies in Literary Types.****Assistant Professor CHAMBERS.**

In 1907-08, the forms of the drama, a study of tragedy, comedy, drame, vaudeville, farce from the masterpieces of each type, taken chiefly from the nineteenth century. Open to qualified Seniors.

2 hrs., first half-year. Tu Th, 11.

**SLAVIC LANGUAGES.**

GEORGE R. NOYES, Ph.D., Assistant Professor of Slavic Languages.

**LOWER DIVISION COURSES.**

**RUSSIAN.**

1. **Elementary Russian.** Assistant Professor NOYES.  
Motti's Russian Grammar. Boyer and Speranski's Russian Reader. Practice in conversation.  
3 hrs., throughout the year. M W F, 1. By special arrangement with the instructor, this course may be counted as work of the Upper Division, as a major course in Slavic Languages.

**UPPER DIVISION COURSES.**

**RUSSIAN.**

- \*2. **Second-Year Russian.** Assistant Professor NOYES.  
Mandelkern's Russisches Elementar-Lesebuch. Composition. Practice in conversation.  
3 hrs., throughout the year.
3. **Third-Year Russian.** Assistant Professor NOYES.  
Mandelkern's Russisches Elementar-Lesebuch. Turgenev's Fathers and Children. Composition. Practice in conversation.  
3 hrs., throughout the year. Hours to be arranged.

**POLISH.**

6. **Elementary Polish.** Assistant Professor NOYES.  
Wicherkiewicz's Polnische Grammatik. Reading of Sienkiewicz and Mickiewicz.  
3 hrs., throughout the year. Hours to be arranged. Prerequisite: Russian 1.

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\* Not to be given in 1907-08.

## FREE ELECTIVE COURSES IN THE UPPER DIVISION.

The following courses do not require a knowledge of any language other than English, and are open to all students of the Upper Division. But, by special arrangement with the instructor, they may be counted as major courses in Slavic Languages.

**20. The Russian Novelists.**

Assistant Professor NOYES.

Lectures and reading. Authors: specially Tolstoy; also Pushkin, Gogol, Turgenev, Dostoevski, Gorki, and others.

3 hrs., first half-year. M W F, 8.

**21. Slavic Literature.**

Assistant Professor NOYES.

Lectures and reading. An outline history of Russian literature, exclusive of the novelists. Some attention will be given to important authors in other Slavic literatures, such as Comenius and Sienkiewicz, and to Slavic folk-lore.

3 hrs., second half-year. M W F, 8.

## COURSES IN OTHER DEPARTMENTS.

**Russian Politics.** [See Political Science 9.]

Assistant Professor NOYES.



**MATHEMATICS.**

IRVING STRINGHAM, Ph.D., Professor of Mathematics.

MELLEN W. HASKELL, Ph.D., Professor of Mathematics.

\*GEORGE C. EDWARDS, Ph.B., Associate Professor of Mathematics and Adviser.

ERNEST J. WILCZYNSKI, Ph.D., Associate Professor of Mathematics.

\*CHARLES A. NOBLE, Ph.D., Assistant Professor of Mathematics and Assistant Examiner.

\*ALBERT W. WHITNEY, A.B., Assistant Professor of Mathematics and of Insurance Methods.

DERRICK N. LEHMER, Ph.D., Assistant Professor of Mathematics.

THOMAS M. PUTNAM, Ph.D., Assistant Professor of Mathematics.

JOHN H. McDONALD, Ph.D., Instructor in Mathematics.

—— —, Instructor in Mathematics.

ALFRED J. CHAMPREUX, B.S., Assistant in Mathematics.

CORA L. WILLIAMS, M.S., Assistant in Mathematics.

E. F. A. CAREY, B.S., Assistant in Mathematics.

Students in the College of Letters, or of Social Sciences, or of Natural Sciences, must include either the subject of Analytic Geometry or Formal Logic as an essential part of their programme of studies for the bachelor's degree. They may satisfy this prescription by electing Mathematics 1A and 1B, or Mathematics 1A and Philosophy 1, in their Freshman year; but these courses are not a sufficient preparation for more advanced courses, and students who desire to continue their mathematical studies beyond the first year should elect Courses C and 5, instead of Courses 1A and 1B. Course B is strongly recommended as an additional elective to all students who have not already studied solid geometry.

Course 2A is prescribed to Freshmen, and Course 2B to Sophomores in the College of Commerce; Course 3A to Freshmen and Course 3B to Sophomores in the Colleges of Engineering and Chemistry; Courses 10A and 10B to Juniors in the College of Mechanics.

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\* Absent on leave, 1907-08.

Students in the College of Agriculture may elect any combination of at least six units which includes analytic geometry.

Students wishing to make a specialty of mathematics should elect Courses C and 5 in the Freshman year, and should consult the members of the department as early as possible.

**The Upper Division.** Courses C, 5, 8, and 9A are prerequisite to work in the Upper Division.

**Teachers' Certificates.** The department will, in general, recommend as qualified to teach mathematics in high schools only such graduates as have passed with credit in at least eighteen units of Upper Division work, including Course 18. The department will exact a practical test of the candidate's ability to present a clear and interesting exposition of subjects taught in the high school.

#### LOWER DIVISION COURSES.

##### A. Elementary Algebraic Theory.

Miss WILLIAMS and Mr. CAREY.

Mathematical Induction, the remainder and factor theorems, the binomial theorem for positive integral exponents, theory of indices, theory of quadratic equations, simultaneous quadratic equations, the progressions, and other simple series.

2 hrs., either half-year. Tu Th, 8. Course A is equivalent to matriculation subject 4a, and is prerequisite to Course 8.

##### B. Solid and Spherical Geometry.

Miss WILLIAMS and Mr. CAREY.

The fundamental propositions of the Euclidean geometry of space.

2 hrs., either half-year. Tu Th, 10. Course B is equivalent to matriculation subject 4b.

##### C. Plane and Spherical Trigonometry.

Mr. CHAMPREUX and Mr. CAREY.

The development of the general formulae of trigonometry. Practice in the use of logarithmic tables. Applications of trigonometry to the solution of triangles and to mensuration in general.

3 hrs., either half-year. M W F, 10; Tu Th S, 9, 10.

**1A. Elements of Analysis.**

Professor HASKELL and Assistant Professor LEHMER.

An exposition of general principles as distinguished from mathematical technique. Fundamental ideas of algebra, trigonometry, and analytic geometry.

3 hrs., first half-year. M W F, 10; Tu Th S, 9.

**1B. Elements of Analysis.**

Professor HASKELL and Assistant Professor LEHMER.

Continuation of Course 1A, with special emphasis upon historical development.

3 hrs., second half-year. M W F, 10; Tu Th S, 9.

**2. Elements of Analysis.**

Associate Professor WILCZYNSKI and Mr. —.

Plane trigonometry, advanced algebra, analytic geometry, and elements of the differential and integral calculus, with applications to problems in Economics.

2A. 3 hrs., throughout the year. M W F, 10. Prescribed to Freshmen in the College of Commerce.

2B. 2 hrs., throughout the year. Tu Th, 10. Prescribed to Sophomores in the College of Commerce.

**ELEMENTS OF ANALYSIS, WITH APPLICATIONS.**

A practical course in algebra, analytic geometry, the differential and integral calculus, adapted particularly to the needs of students in Engineering and Chemistry.

**3A. First Course.**

Associate Professor WILCZYNSKI,

Assistant Professors LEHMER and PUTNAM, Dr. McDONALD,

Mr. CHAMPREUX, Miss WILLIAMS, and Mr. CAREY.

3 hrs., throughout the year, beginning either half-year. M W F, 8, 9, 10; Tu Th S, 8. Prescribed, Freshman year, in the colleges of Engineering and Chemistry.

**3B. Second Course.**

Associate Professor WILCZYNSKI,

Assistant Professors LEHMER and PUTNAM, Dr. McDONALD,

Mr. CHAMPREUX, and Miss WILLIAMS.

3 hrs., throughout the year, beginning either half-year. M W F, 8, 9. Prescribed, Sophomore year, in the colleges of Engineering and Chemistry.

**5. Plane Analytic Geometry.** Assistant Professor LEHMER,  
Dr. McDONALD, Mr. CHAMPREUX, and Mr. —.

The analytic geometry of the straight line, the circle, and the conic sections, including a discussion of the general equation of the second degree and some special examples of higher loci.

3 hrs., either half-year. First half-year, Tu Th S, 8, 9; second half-year, Tu Th S, 8, 9. Prerequisite: Course C or matriculation subject 12a<sup>2</sup>.

**8. Algebra.** Mr. —.

Inequalities and limits, exponentials and logarithms, permutations and combinations, binomial theorem for any index, expansion of functions in series, convergency of series.

3 hrs., either half-year. First half-year, M W F, 3; Tu Th S, 9. Second half-year, Tu Th S, 8. Prerequisite: Course A or matriculation subject 4a.

**9A. Differential Calculus.** Assistant Professor PUTNAM.

The fundamental principles and formulae of the differential calculus, with applications to various problems of geometry and analysis, such as indeterminate forms, maxima and minima, expansion of functions in series, etc.

3 hrs., second half-year. M W F, 9. Prerequisite: Courses 5 and 8. Students wishing to begin the calculus in the first half-year may elect 3B.

### UPPER DIVISION COURSES.

These courses are open to students in the Lower Division who have the necessary prerequisites. Courses 13 and 20A have no prerequisites and are available as free electives in any college.

**9B. Integral Calculus.** Assistant Professor PUTNAM.

The fundamental principles and formulae of the integral calculus, with applications to geometry, such as lengths of curves, areas and volumes, centers of position, etc.

3 hrs., first half-year. M W F, 9. Prerequisite: Course 9A.

**10A. Advanced Calculus I.** Professor HASKELL  
and Associate Professor WILCZYNSKI.

Definite integrals, multiple integrals, theory and use of infinite series, applications to practical problems.

2 hrs., first half-year. M W, 10, 11; Tu Th, 8. Prescribed, Junior year, in the College of Mechanics.

**10B. Advanced Calculus II.**

Professor HASKELL

and Associate Professor WILCZYNSKI

The differential equations, both ordinary and partial, which occur most frequently in the applications, with special stress on approximate numerical solutions.

2 hrs., second half-year. M W, 10, 11; Tu Th, 8. Prescribed, Junior year, in the College of Mechanics.

**11A. Determinants and Theory of Numerical Equations.**

Professor STRINGHAM.

The theory of determinants, with applications to geometry and algebra. Transformation of equations, solution of numerical equations, elimination, symmetric functions, continued fractions.

3 hrs., first half-year. Tu Th S, 10. Prerequisite: Course 8.

**11B. Algebraic Theory of Equations.**

Professor STRINGHAM.

The theory of equations, from the point of view of the theory of substitutions and of the theory of invariants.

3 hrs., second half-year. Tu Th S, 10. Prerequisite: Course 11A.

**12A. Advanced Analytic Geometry.**

Professor HASKELL.

General properties of conic sections; introduction to the theory of higher plane curves.

3 hrs., first half-year. M W F, 2. Prerequisite: Course 5.

**12B. Analytic Geometry of Three Dimensions.**

Assistant Professor PUTNAM.

The elementary analytic geometry of the straight line in space, the plane, the sphere, and the conicoids, and a discussion of the theory of higher curves and surfaces, including the determination of curvature, by the methods of the differential calculus.

3 hrs., second half-year. M W F, 10. Open only to students who have taken, or are taking, Course 9A.

**13. Synthetic Projective Geometry.**

Assistant Professor LEHMER.

3 hrs., first half-year. Tu Th S, 10.

**14. Higher Plane Curves.**

Professor HASKELL.

Introduction to the theory of higher plane curves, with special reference to the problem of curve-tracing in Cartesian and in homogeneous coördinates.

3 hrs., second half-year. M W F, 2. Prerequisite: Course 9A.

**16. Vector Analysis.**

Professor STRINGHAM.

A comparative study of the various systems of Hamilton, Grassmann, Gibbs, and others. The development of fundamental principles with special reference to their applications in mathematical physics.

3 hrs., throughout the year. M W F, 2.

**17. Calculus of Finite Differences.**

Professor HASKELL.

2 hrs., second half-year. Tu Th, 11. Prerequisite: Course 9B.

**20A. Theory of Probabilities; Elementary Course.**

Associate Professor WILCZYNSKI.

2 hrs., first half-year. Tu Th, 9. This course is prerequisite to Courses 10 and 11 in Economics.

**\*20B. Theory of Probabilities; Advanced Course.**

Assistant Professor WHITNEY.

Curves of error, correlation surfaces, applications to statistical problems in economics and biology.

3 hrs., second half-year. Prerequisite: Course 20A and a thorough course in calculus.

**GRADUATE COURSES.****18. Logic of Mathematics.**

Professor STRINGHAM.

Analysis of the foundation principles of geometry and algebra. The number-system and the vector-system of algebra compared. The geometrical theory of proportion, and the irrational. The non-Euclidean geometry. Outlines of the history of mathematical discovery, and of the development of mathematical thought, with special reference to its significance as a factor in intellectual progress.

3 hrs., throughout the year. M W F, 1. Designed especially for teachers and prospective teachers of mathematics. Prerequisite: A course in formal logic.

**21. Theory of Functions of Real Variables.**

Assistant Professor PUTNAM.

Simple and multiple integrals; line, surface, and space integrals; Laplace's Equation and its applications; series; geometrical applications.

3 hrs., first half-year.

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\* Not to be given in 1907-08.

**\*23. Partial Differential Equations.**

Associate Professor WILCZYNSKI.

3 hrs., second half-year.

**24. Theory of Functions of a Complex Variable.**

Professor HASKELL.

(Introductory course.) Lectures on the general theory of functions, including the elements of elliptic functions.

3 hrs., throughout the year. M W F, 3.

**25. Projective Differential Geometry.**

Associate Professor WILCZYNSKI.

3 hrs., throughout the year.

**26. Absolute Geometry.**

Professor STRINGHAM.

An analytical treatment of the absolute geometry of space.

3 hrs., throughout the year. M W F, 2.

**29. Fourier's Series, Spherical Harmonics, Lamè's and Bessel's Functions.**

Dr. McDONALD.

3 hrs., throughout the year.

**\*31A. Theory of Numbers.**

Assistant Professor LEHMER.

Elementary properties of numbers, theory of congruences, residues of powers, primitive roots, quadratic forms, generic characters, composition of forms.

3 hrs., first half-year.

**\*31B. Theory of Numbers.**

Assistant Professor LEHMER.

Continuation of Course 31A. Cyclotomy, number of classes of binary quadratic forms, Gaussian sums, general theory of algebraic integers.

3 hrs., second half-year.

**40. Mathematical Seminary.**

Professor STRINGHAM.

Conferences between members of the mathematical department and students engaged in higher mathematical work, for the discussion of questions related to their studies, and for the examination of recent mathematical literature; under the direction of Professor STRINGHAM. Meetings once a week. Tu, 2-4. Credit value to be determined in each case.

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\* Not to be given in 1907-08.

**PHYSICS.**

FREDERICK SLATE, B.S., Professor of Physics.

E. PERCIVAL LEWIS, Ph.D., Associate Professor of Physics.

WILLIAM J. RAYMOND, B.S., Assistant Professor of Physics.

ELMER E. HALL, Ph.D., Assistant Professor of Physics.

THOMAS C. MCKAY, Ph.D., Instructor in Physics.

ARTHUR S. KING, Ph.D., Instructor in Physics.

ARTHUR W. GRAY, Ph.D., Instructor in Physics.

— — —, Instructor in Physics.

WILLIAM R. STAMPER, Mechanician in the Department of Physics.

(And eight Assistants in Lecture-room and Laboratories.)

Courses 1 to 3 are fundamental and designed to meet the needs of students preparing for applications of Physics, or advanced work in the subject itself. Course 19 is especially designed for students in the Colleges of Letters and Social Sciences. By special arrangement with the Professor of Physics, Course 4 may be substituted for Course 2A as a prerequisite for other work in Physics, or for work in other departments; or Courses 4 and 18 together may replace Courses 1 and 2A, in order to shorten the preparation for advanced work. Courses 2A and 4 are alternatives; credit toward graduation will not be allowed for both of them. Students who have completed Course 1 will profit greatly if they supplement the course of laboratory work regularly laid out. For credit on special and supplementary laboratory work see Course 18. The physical laboratory will be open five days a week throughout the year, and may be used, under the guidance of the instructors concerned, by advanced students.

Laboratory deposits are at the rate of five dollars a half-year for each laboratory exercise a week. The average amount returned to the student at the end of the half-year, after deducting for cost of materials used and for breakage of apparatus, is about one-half of the deposit.

Students who choose Upper Division courses in Physics must include an adequate amount of laboratory exercises in the work



chosen; the instructors should be consulted on this point. Such students are strongly advised to take Course 5A in the Junior year.

**Teachers' Certificates.** Twenty-four units of Physics will be required for recommendation for the teachers' certificate. Applicants for the recommendation in Physics, in making up this number of units, must include in their work the equivalent of Courses 1 and 3, with either Course 4 or Course 2A. See statements under these headings, and under Course 18. (*In all cases proposed combinations of courses should be submitted for approval to the Professor of Physics.*)

#### LOWER DIVISION COURSES.

**1. General Physics.** Dr. KING, Dr. GRAY, and ———.

Properties of matter, mechanics, and heat. Laboratory exercises twice a week, preceded by a lecture or a recitation.

5 hrs., throughout the year; 3 units each half-year. Sec. I, M, 1-4, F, 1-3; II, Tu, 9-12, Th, 9-11; III, Tu, 1-4, Th, 1-3; IV, W, 1-4, S, 9-11. Open to students who have passed the entrance examination in Physics. Prescribed: Freshman year, in the Colleges of Engineering and Chemistry.

**2A. General Physics.**

Associate Professor LEWIS and Assistant Professor HALL.

Lectures with experimental illustration, recitations, and problems. Sound, light, magnetism, and electricity presented as a continuation of Course 1.

3 hrs., throughout the year. Section I, Tu Th S, 11, Associate Professor LEWIS; Section II, M W F, 10, Assistant Professor HALL. Open to students who have passed an examination covering the ground of Course 1. Prescribed, Sophomore year, in the Colleges of Chemistry and Civil Engineering (Section I); and in the Colleges of Mining and Mechanical Engineering (Section II).

**3. Physical Measurement.**

Dr. MCKAY.

Experimental work in sound, light, electricity, and magnetism, requiring quantitative results. Methods are selected so as to show instructive relations of physical principles, and their adaptation to practical problems. The course is varied by means of alternative experiments, to suit the needs of students in the different colleges. Laboratory exercises once or twice a week.

3 or 6 hrs., throughout the year; 1 or 2 units each half-year. Section I, M F, 1-4; II, Tu Th, 9-12; III, Tu Th, 1-4; IV, W, 1-4; S, 8-11. Prescribed, Sophomore year, in the colleges of Engineering and Chemistry; but once a week only in these colleges.

**\*4. General Physics.**

Professor SLATE.

Lectures with experimental illustration and recitations on topics in heat, light, sound, and electricity; giving prominence to subjects which are of importance as connected with the growth and the present condition of the science.

3 hrs., throughout the year. M W F, 2. Prerequisite: At least full Sophomore standing. The attention paid to methods of presentation makes this a profitable course for prospective teachers of elementary physics.

UPPER DIVISION COURSES.

**5; 5A. Analytic Mechanics.**

Professor SLATE,

Assistant Professor RAYMOND, and Dr. GRAY.

5. The mathematical treatment of principles of dynamics and statics that are fundamental for engineers, illustrated by problems and applications.

3 hrs., throughout the year. M W F, 8. Three sections. Prerequisite: Mathematics 9 or 3B. Prescribed, Junior year, in the colleges of Engineering.

\*5A. Mechanics for students of physics.

5 hrs., first half-year. M Tu W Th F, 8. Prerequisite: Mathematics 9 or 3B; Physics 2A or 4.

**7. Electrical Measurements.**

Assistant Professor RAYMOND.

One lecture and two laboratory exercises a week.

7 hrs., second half-year; 3 units. Lecture, W, 10. Laboratory, Tu Th, 1-4. Prerequisite: First half of Course 5, and Courses 1, 2A, 3, and 10. Elective, Junior year, in the College of Mechanics.

**\*8. Physical Optics.**

Assistant Professor HALL.

Lectures, with experimental illustrations and recitations, on selected topics in light, relating to the theory of optical instruments.

2 hrs., first half-year. Tu Th, 9. Prerequisite: Course 2A or 4; Mathematics 9 or 3B.

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\* Not to be given in 1907-08.

**8A. Polarized Light.**

Associate Professor LEWIS.

Laboratory work, with occasional lectures. Methods of producing and detecting plane, circularly, and elliptically polarized light. Practical applications in crystallography, saccharimetry, and metallic reflection. Optical activity.

6 hrs., second half-year. Prerequisite: Courses 1, 2A, and 3, or their equivalent.

**9A. Molecular Physics.**

Assistant Professor HALL.

A descriptive study of the gaseous, liquid and solid states of matter. Lectures with reading and discussion.

2 hrs., second half-year. Tu Th, 11. Prerequisite: Courses 1 and 2A or 4 and Mathematics 9 or 3B.

**10. Electricity.**

Assistant Professor RAYMOND.

Elements of the mathematical theory of electricity and magnetism, with some of the more important applications. Lectures and laboratory work.

3 hrs., first half year. Lectures Tu Th, 10; laboratory —. Prerequisite: Course 2A or 4; Mathematics 9 or 3B. Prescribed, Junior year, in the College of Mechanics.

**10A. Electricity.**

Assistant Professor HALL.

Elements of the theory of magnetism and electricity, with laboratory exercises in electrical measurements.

8 hrs., first half-year; 4 units. Lectures Tu Th, 11. Laboratory Tu Th, 1-4. Prerequisite: Course 2A or 4 and Mathematics 9 or 3B.

**\*11A; 11B. Electric Discharges through Gases.**

Associate Professor LEWIS.

11A. Lectures, experimentally illustrated, on phenomena of the flame and electric arc, spark, and vacuum-tube; and on cathode rays, Röntgen rays, and radioactivity.

2 hrs., first half-year. Tu Th, 9. Prerequisite: Course 2A or 4. This course is recommended as preliminary to Course 11.

11B. Laboratory work for students who wish to supplement Course 11A by the individual study of practical problems.

3 or 6 hrs., second half-year.

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\* Not to be given in 1907-08.

**12. Theory of Heat and Thermodynamics.**

Dr. MCKAY.

Lectures twice a week; for Juniors and Seniors.

2 hrs., second half-year.

**\*12A. Energetics.**

Professor SLATE.

A non-mathematical account of forms and transformations of energy. Lectures; open to qualified students.

2 hrs., first half-year.

**12B. Heat Measurements.**

Dr. MCKAY.

Thermometry, calorimetry, pyrometry, and general heat measurements, adapted for students of physics, chemistry, and engineering. One lecture and one laboratory exercise a week.

4 hrs., second half-year; 2 units.

Supplementary to 12B: Measurements of intensity of radiation from hot bodies, illustrating the laws of Stefan, Wien, and Planck; also of emissivity and diathermancy. 3 hrs.; 1 unit.

**\*13. Physical Optics.**

Assistant Professor HALL.

Laboratory exercises connected with Course 8, and in extension of it.

6 hrs., first half-year; 2 units. Tu Th, 1-4.

**14. Advanced Physical Measurement.**

Assistant Professor RAYMOND.

Problems involving accurate measurement and mathematical work. Laboratory exercises twice a week.

6 hrs., first half-year; 3 units. Tu Th, 1-4. Elective, Senior year, in the College of Mechanics.

**†18. Special Undergraduate Study.**

Assistant Professor HALL, Dr. MCKAY, and Dr. GRAY.

All special laboratory work not included in courses announced above. Credit value to be fixed in each case. By special arrangement with the Professor of Physics, this course may be made the equivalent of parts of the regular laboratory work under Courses 1 and 3.

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\* Not to be given in 1907-08.

† May be chosen as Upper Division work by special arrangement only.

**19. Modern Developments in Physics and Their Historical Foundation.** Professor SLATE and Associate Professor LEWIS.

Experimental lectures of simplified character, adapted to the position of students without special preparation in physics. The exposition gives prominence to the twofold importance of many later discoveries; as contributing to scientific progress through the necessary restatement of physical ideas and also promoting the convenience of civilized life.

2 hrs., throughout the year. Tu Th, 3. But the work of each half-year may be taken separately. Open without prerequisite to all students in the Upper Division.

First half-year: The underlying unity of optical and electrical phenomena, and the explanation of them in common terms.

Second half-year: The inter-relations of magnetism, electricity, and matter. Their scientific interpretation and practical applications.

**GRADUATE COURSES.**

**6. Harmonic Motion.**

Assistant Professor RAYMOND.

The analytical treatment of vibratory and wave-motion, with application to sound, light, and electricity. Lectures with experimental illustrations.

2 hrs., first half-year. Prerequisite: Course 5 or 5A, and Course 2A or 4.

**6A. Electric Waves and Oscillations.**

Assistant Professor RAYMOND.

2 hrs., second half-year. Lectures, with experimental illustrations. Prerequisite: Course 6.

**11; 11C. Spectroscopy.**

Associate Professor LEWIS.

11. Lectures, with experimental illustration, on methods and results of investigation, and spectroscopic theories.

2 hrs., first half-year. Tu Th, 9. Prerequisite: Course 8. Course 11A also will be found helpful.

11C. Laboratory work for students who wish to familiarize themselves with the use of spectroscopic apparatus, or to supplement Course 11 by the individual study of practical problems.

3 or 6 hrs., second half-year.

**\*15. Dynamics of Rotation.**

Professor SLATE.

Theory of the gyroscope, and related problems.

3 hrs., first half-year. Prerequisite: Course 5 or 5A.

**15A. Precession and Nutation.**

Professor SLATE.

3 hrs., second half-year, in alternate years with Course 15. Prerequisite: Courses 5 or 5A and 15.

**16. Special Advanced Study and Research.**

Associate Professor LEWIS and Assistant Professor RAYMOND.

Laboratory work throughout the year, on problems assigned according to the preparation and needs of individual students. Credit value to be fixed in each case.

**17. Readings and Discussions.**

Professor SLATE.

Work for Seniors and graduate students upon selected topics.

For 1907-08 the selection is: The generalized equations of dynamics, and their application to electrons. Especial attention will be given to vector forms of equation.

2 hrs., throughout the year.

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\* Not to be given in 1907-08.

**ASTRONOMY.**

ARMIN O. LEUSCHNER, Ph.D., Sc.D., Professor of Astronomy, and  
Director of the Students' Observatory.

RUSSELL T. CRAWFORD, Ph.D., Assistant Professor of Practical As-  
tronomy.

STURLA EINARSON, A.B., Assistant in Astronomy.

ESTELLE GLANCY, A.B., Watson Assistant in Astronomy.

**Special Announcement.** A special announcement concerning the facilities and the courses of instruction in the Berkeley Astronomical Department, and in the Lick Astronomical Department, at Mount Hamilton, has been published. Copies may be obtained from the Director of the Lick Observatory, Mount Hamilton, California, or from the Director of the Students' Observatory, Berkeley, California.

Courses 1A, 1B, 2, and 5 are designed especially to fulfill the requirement in prescribed natural science for students in the colleges of general culture.

A part of Courses 1A and 1B consists of special lectures at the regular hour by the Director and Astronomers of the Lick Observatory.

Goedesy, navigation, and nautical astronomy, especially adapted to the needs of students in the College of Commerce, will be included in Courses 2 to 4, but a special section for such students may be formed.

**LOWER DIVISION COURSES.**

**1A. Elements of Astronomy.** Assistant Professor CRAWFORD.

An introductory course. General facts and principles underlying the science of astronomy in all its branches.

2 hrs., first half-year. Tu Th, 11. Prerequisite to Geography 9.

**1B. Modern Astronomy.** Professor LEUSCHNER,  
the Director and Astronomers of the Lick Observatory.

Progress in astronomy through modern methods, especially spectroscopic and photographic.

3 hrs., second half-year. Tu Th, 11; S, 9.

For observatory work in connection with Courses 1A and 1B students will ordinarily elect Course 2; but may, instead, take Course 4A or 4B, subject to the prerequisites announced.

**2. Supplement to Courses 1A and 1B.**

Assistant Professor CRAWFORD and Mr. EINARSON.

Practice in observing in connection with Courses 1A and 1B.

Hours and credit value to be arranged with the instructors.

The observatory is open for this course two evenings, two afternoons, and Saturday morning. The course is open to students who are taking or have taken either Course 1A or 1B or 3. One unit of this course is prerequisite to Geography 9.

**5. History of Astronomy.**

Assistant Professor CRAWFORD.

3 hrs., second half-year. M W F, 1.

**UPPER DIVISION COURSES.\***

**3A. General Astronomy.**

Assistant Professor CRAWFORD.

3 hrs., first half-year. Hours to be arranged with the instructor.

Prerequisite: Mathematics C and 5, and Physics 1 or 4. For observatory work in connection with this course, students may elect Course 2, 4A, or 4B, subject to the prerequisites announced.

**3B. General Astronomy.**

Assistant Professor CRAWFORD.

A continuation of Course 3A.

2 hrs., second half-year. Hours to be arranged with the instructor. Prerequisite: Course 3A.

**4A. Practical Astronomy.**

Professor LEUSCHNER.

Lectures and observatory work. Goedsy, navigation, and nautical astronomy. Practical work at the observatory with sextant, clock, chronograph, transit-and-zenith telescope, equatorial telescope, photographic telescope, reflector, altazimuth instrument. Computing.

Hours and credit value to be arranged with the instructor. Prerequisite: Mathematics C and 5; Physics 1 or 4; and either Course 1A or 3A in Astronomy. The course should also be preceded by a course in differential calculus.

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\* All Upper Division Courses have specific prerequisite.



**4B. Practical Astronomy.**

Assistant Professor CRAWFORD and Mr. EINARSON.

The subject-matter of Course 4A more briefly presented, and adapted to the needs of students of Civil Engineering.

4 hrs., 2 units, first half-year; 4 hrs., 2 units, second half-year. Each half-year, lecture, Tu or Th, 9, and one observatory period. The observatory is open for this course two evenings, and Saturday morning. The arrangement of the work depends so largely upon weather conditions, that the student should reserve for this course several observatory periods. Prerequisite for students not in the College of Civil Engineering: Mathematics C and 5; Physics 1 or 4; and either Course 1A or 3A in Astronomy. Prescribed, Senior year, in the Railroad Course, College of Civil Engineering.

**6. Theoretical Astronomy.**

Assistant Professor CRAWFORD.

4 hrs., throughout the year. Hours to be arranged with the instructor. Prerequisite: Course 1A or 3A; Mathematics 9 or 9B; ordinarily also Physics 5.

**7A. Method of Least Squares.**

Professor LEUSCHNER.

The fundamental principles and processes of the method of least squares, and their application to the solution of astronomical, physical, and engineering problems.

4 hrs., 2 units, first half-year. Lecture Tu, 10. A three-hour period for practical application to be announced. Prerequisite: Working knowledge of the differential and integral calculus. Prescribed, Junior year, two units, in the Course in Railroad Engineering, College of Civil Engineering.

**8. Introduction to Interpolation, Use of Tables, and Mechanical Quadratures.**

Professor LEUSCHNER.

The more useful formulae of interpolation, and their application in the use of astronomical and other tables. Development of the formulae of numerical differentiation and integration, and their application in the construction of tables. Practice in extensive numerical computations, with special aim at rapidity and exactness. Calculating machines.

First half-year. Hours and units to be arranged with the instructor. Prerequisite: Mathematics 9 or 9B.

**9. Interpolation, Use of Tables, and Mechanical Quadratures.**

Professor LEUSCHNER.

Second half-year. Hours and units to be arranged with the instructor. Prerequisite: Course 8.

**10. Determination of the Longitude and Latitude.**

Assistant Professor CRAWFORD.

A continuation of Course 4A or 4B. The students determine the longitude (by the telegraphic method) or the latitude (by the method of Talcott) of the Students' Observatory.

Hours and credit value to be arranged with the instructor. Prerequisite: Course 4A or 4B.

**11. Advanced Practical Astronomy.**

Assistant Professor CRAWFORD.

The theory of refraction; eclipses.

2 hrs., second half-year. Hours to be arranged with the instructor. Prerequisite: Course 4A or 4B.

## GRADUATE COURSES.

**12. Theoretical Astronomy.**

Professor LEUSCHNER.

This course treats of the relative accuracy of the various methods of determining preliminary orbits.

2 or 4 hrs., either half-year. Hours to be arranged with the instructor. Prerequisite: Course 6.

**13. Perturbations and Celestial Mechanics.**

Associate Professor LEUSCHNER.

Adapted to the needs and preparation of the students. The course may be continued through three years.

The following subjects are treated: General principles; special perturbations in rectangular and polar coördinates; method of variation of constants; method of determining the general perturbations of the minor planets after Hansen, Newcomb, and Hill; Gylden's method after Brendel's *Theorie der kleinen Planeten*. Bohlin's *Gruppenweise Berechnung der Störungen*. Selected topics from Tisserand's *Mécanique Céleste*. Poincaré's *Les Nouvelles Méthodes de la Mécanique Céleste*; Gylden's works, etc.

Hours and credit value to be arranged with the instructor.

**14. Advanced Practical Astronomy.**

Assistant Professor CRAWFORD.

3 hrs., throughout the year; 1 unit each half-year. Hours to be arranged with the instructor. Prerequisite: Course 4A.

**15. Advanced Study and Research.**

Professor LEUSCHNER

and Assistant Professor CRAWFORD.

Investigation of special problems to be selected according to the preparations and the needs of individual students.

Hours and credit value arranged in each case.

**\*16. Measurement and Reduction of Astronomical Photographs; Spectrograms.**

2 hrs., second half-year. Th, 1-3.

**LICK OBSERVATORY.**

The Lick Observatory at Mount Hamilton forms a separate department of the University. The unrivaled facilities for advanced astronomical work which are offered by its fine equipment, in this favorable location, are too well known to require description here. The department is open to graduate students under regulations prescribed by the Regents. (See REGISTER, under Lick Astronomical Department.) The degrees of Master of Science and Doctor of Philosophy are offered to students who have fulfilled the required conditions. (See REGISTER, under Graduate Department.) For information relating to graduate work at the Observatory, intending students should address the Recorder of the Faculties, at Berkeley, or the Director of the Lick Observatory, at Mount Hamilton, Santa Clara County, California.

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\* Not to be given in 1907-08.

**GEOGRAPHY.**

GEORGE DAVIDSON, Ph.D., ScD., Honorary Professor of Geodesy and Astronomy; Professor of Geography, Emeritus.

RULIFF S. HOLWAY, A.B., M.S., Assistant Professor of Physical Geography.

LINCOLN HUTCHINSON, M.A., Assistant Professor of Commerce.

Courses 9 and 10 are elementary courses and may be counted for prescribed science. Course 12 is designed to give a general knowledge of the elements of meteorology, and is prescribed for those asking for the teacher's certificate in Physical Geography.

**Teacher's Certificate.** Applicants for the teacher's certificate in Physical Geography should have a broad training in elementary science. They should also have some work in both economic and historical geography. For the present either Course 3A, Introduction to Economic Geography, or History 63A, Historical Geography of Modern Europe, will be accepted as part of the twenty units required for the teacher's certificate.

**LOWER DIVISION COURSES.****7. General Physical Geography.** Assistant Professor HOLWAY.

A general survey of land forms, climatology, oceanography, and planetary relations as they affect the work of man. Prerequisite to Economics 3A. Students specializing in Geography should omit Geography 7; and take Geography 9, 10, and 12 as their general preparation for advanced work.

2 hrs., first half-year. Tu Th, 2.

**\*3A. Introduction to Economic Geography.**

Assistant Professor HUTCHINSON.

A study of the relations between geography and economics, the phenomena of mathematical, physical, and bio-geography and their connection with economic development.

2 hrs., second half-year. Tu Th, 2. Prerequisite: Geography 7.

**\*3B. Materials of Commerce.** Assistant Professor HUTCHINSON.

The geographical distribution of useful animal, vegetable, and mineral products; influence of climate, soil, and other physical conditions; "zones" of vegetation and cultivation, fau-

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\* Not to be given in 1907-08.

nal "zones," etc.; geographical factors determining the location of manufacturing and mining industries.

2 hrs., first half-year. Tu Th, 10. Prerequisite: Course 3A or its equivalent.

**3C. Economic Geography of the United States.**

Assistant Professor HUTCHINSON.

Especial attention is given to California and other Pacific Coast states.

2 hrs., second half-year. Tu Th, 11. Prerequisite: Courses 3A and 3B or their equivalent.

**\*4A. Geography of International Trade.**

Assistant Professor HUTCHINSON.

Demand and supply in the world markets; exports and imports of the leading countries; sea-ports; commercial and industrial centers; routes and methods of transportation; postal and telegraphic communication; etc.

2 hrs., first half-year. Tu Th, 10. Prerequisite: Course 3A and 3B, or their equivalent.

**9. Introductory Geography.**

Assistant Professor HOLWAY.

Fundamental planetary relations in geography, including change of seasons and other effects of the earth's motions. Non-mathematical study of common map projections and of methods of making relief models. Lectures and laboratory work.

2 hrs., second half-year. Tu Th, 8.

Open to those who are taking or have taken Astronomy 1A and one unit of 2. Prescribed for admission to Courses 10 and 12 for candidates for the teacher's certificate in Physical Geography.

**9B. Relief Modeling.**

Assistant Professor HOLWAY.

Laboratory work in making relief models. May be taken with Course 9 or with Upper Division Courses.

Either half-year. Hours and credit to be arranged.

**10. Physiography of the Lands.**

Assistant Professor HOLWAY.

Lectures, reading and reports, laboratory and field work. Primarily for those preparing to teach Physical Geography in the high schools; includes a study of the present land forms and of the forces and processes that have resulted in these forms and of their effect upon human development.

3 hrs., first half-year. M W F, 8.

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\* Not to be given in 1907-08.

**12. Meteorology.**

Assistant Professor HOLWAY.

An elementary presentation of the principles of meteorology, the general circulation of the atmosphere, storms, the work of the Weather Bureau, and some consideration of climate in relation to plant and animal life. Laboratory work in observing and charting weather phenomena.

2 hrs., first half-year. Tu Th, 8.

## UPPER DIVISION COURSES.

**1. The Currents and Climatology of the Pacific Ocean.**

Professor DAVIDSON.

The geography, productions, and commerce of the countries bordering the Pacific Ocean and contiguous waters. The highways of commerce. The great canals. The great river and lake systems of the world. The geography of raw products. Submarine telegraph cables. The colonial systems of the world.

3 hrs., first half-year. M W F, 2.

**2. The Currents and Climatology of the Pacific Ocean.**

Professor DAVIDSON.

Continuation of Course 1.

3 hrs., second half-year. M W F, 2.

**14. Oceanography.**

Assistant Professor HOLWAY.

A study of the ocean and the oceanic circulation; includes reading and reports and some laboratory work in mapping and interpreting the observations upon which our knowledge of the ocean is based.

2 hrs., first half-year. Tu Th, 9.

**15. Physiography of California.**

Assistant Professor HOLWAY.

A study of the physiographic provinces of California—their climate and physical features.

3 hrs., second half-year. M W F, 9. Prerequisite: Geography 10 or Geology 1A.

**16. Physiography of North America.**

Assistant Professor HOLWAY.

A physiographic study of North America.

2 hrs., second half-year. Tu Th, 9.

**\*17. Physiology of Eurasia.**

Assistant Professor HOLWAY.

A physiographic study of Europe and Asia as an introduction to their history and development.

2 hrs., second half-year. Tu Th, 9.

**41. Geography of Spanish America.**

Assistant Professor HUTCHINSON.

A general description of the countries of South and Central America: their geology, topography, climate, population, natural resources, industries, foreign trade, etc. The object of the course is to give the student a comprehensive view of conditions existing in these countries and the possibilities of development which there exist.

2 hrs., first half-year. Tu Th, 11.

**GRADUATE COURSES.**

**20. The Teaching of Physical Geography.**

Assistant Professor HOLWAY.

A discussion of the teaching of physical geography in secondary schools, with a study of recent text-books, laboratory manuals, and laboratory and field work.

1 hr., second half-year. F, 4.

**21. Special Problems.**

Assistant Professor HOLWAY.

Special courses for advanced students. In general some field work will form part of such courses. Hours to be arranged.

**38. Commercial Resources of the Spanish-American Countries.**

Assistant Professor HUTCHINSON.

Investigation course in the geography, natural resources, and possibilities of development of the countries lying to the south of the United States, devoting a year to each. In 1907-08 Chile will be studied. Particular attention will be given to commercial relations with the United States.

2 hrs., throughout the year. Hours to be arranged. Open only to graduate students who satisfy the instructor of their preparation for the work.

**COURSES IN OTHER DEPARTMENTS.**

**Historical Geography of Modern Europe.** (See History 63A.)

Mr. SMITH.

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\* Not to be given in 1907-08.

**CHEMISTRY.**

WILLARD B. RISING, M.E., Ph.D., Professor of Chemistry.

EDMOND O'NEILL, Ph.B., Professor of Inorganic Chemistry.

WALTER C. BLASDALE, Ph.D., Assistant Professor of Chemistry.

HENRY C. BIDDLE, Ph.D., Assistant Professor of Chemistry.

WM. CONGER MORGAN, Ph.D., Assistant Professor of Chemistry.

FREDERICK G. COTTRELL, Ph.D., Assistant Professor of Physical Chemistry.

EDWARD BOOTH, Ph.B., Instructor in Chemistry.

Matriculation Chemistry, subject 12*b*, is usually prerequisite to all courses in Chemistry, excepting Course 1*A*. To students who have not taken chemistry in the high schools, an opportunity to do preparatory work is offered during the Summer Session of the University.

Courses 1 and 3 are prerequisite to all other courses in Chemistry. Course 5*A* or 5*B* is prerequisite to Courses 9 to 31.

Courses 1, 3, 5*A*, 8, and 28 are prerequisite for a teacher's recommendation in chemistry.

Laboratory deposits are fifteen dollars a half-year for Course 3, and ten to thirty dollars a half-year for the other laboratory courses. The average amount returned to the student at the end of the half-year, after deducting for cost of materials, gas, etc., actually used, and for breakage of apparatus, is about three dollars in Course 3, and about five dollars in the other courses.

**LOWER DIVISION COURSES.****1. General Inorganic Chemistry.** Assistant Professor MORGAN.

Lectures, with study of a manual, and full experimental illustration.

3 hrs., throughout the year. Two sections. M W F, Section I, 9; Section II, 10. Usual prerequisite: Matriculation Chem-



istry, subject 12b. This course is ordinarily taken in conjunction with Course 3. Prescribed, Freshman year, in the Colleges of Engineering and Chemistry.

**3. Laboratory: Qualitative Analysis.**

Assistant Professor MORGAN and Mr. BOOTH.

Laboratory practice in qualitative analysis; designed to familiarize the student with the facts and principles of general inorganic chemistry.

6 hrs., throughout the year; 2 units each half-year. Four sections. Section I, M F, 1-3, Assistant Professor MORGAN; II, Tu Th, 9-11, Mr. BOOTH; III, Tu Th, 1-3, Mr. BOOTH; IV, W, 1-3, and S, 9-11, Mr. BOOTH. Prerequisite: Matriculation Chemistry, Subject 12b. Prescribed, Freshman year, in the Colleges of Engineering and Chemistry. Section I is for students in Colleges of Chemistry and Natural Science, Sections II, III, and IV for students in the Colleges of Engineering.

**5A. Laboratory: Quantitative Analysis—Gravimetric and Volumetric.**

Assistant Professor BLASDALE.

Elementary course in the principles of quantitative analysis; practice in gravimetric and volumetric analysis, with weekly lectures and discussions.

7 hrs., first half-year; 3 units. Lecture W, 1. Laboratory M F, 1-4. Prescribed, optionally with 5B, Sophomore year, in the Colleges of Mining and Chemistry. Prerequisite, alternatively with 5B, to Courses 9 to 31.

**5B. Laboratory: Quantitative Analysis—Gravimetric.**

Assistant Professor BLASDALE.

General principles; practice in gravimetric determinations, with weekly lectures and discussions.

7 hrs., first half-year; 3 units. Two sections. Section I, lecture M, 1; laboratory W F, 1-4. Section II, lecture Tu, 1; laboratory Th, 1-4; S, 9-12. Prescribed, Sophomore year, in the College of Mining, and, optionally with 5A, to students in the College of Agriculture who intend to elect work in the agricultural and viticultural laboratories.

**6. Laboratory: Quantitative Analysis—Volumetric.**

Assistant Professor BLASDALE.

General principles, with weekly lectures and discussions.

7 hrs., second half-year; 3 units. Two sections. Section I, lecture M, 1; laboratory W F, 1-4. Section II, lecture Tu, 1; laboratory Th, 1-4; S, 9-12. Prerequisite: Course 5A or 5B. Prescribed, Sophomore year, in the College of Mining.

**8A. Organic Chemistry.**

Assistant Professor BIDDLE.

Introductory course. Lectures and recitations, with experiments.

2 hrs., first half-year. Tu Th, 8. Prescribed, Sophomore year, in the College of Chemistry.

**8B. Organic Chemistry.**

Assistant Professor BIDDLE.

Continuation of Course 8A. Lectures and recitations. Prescribed, Sophomore year, in the College of Chemistry.

2 hrs., second half-year. Tu Th, 8. Prerequisite: Course 8A.

UPPER DIVISION COURSES.

*Free Elective.*

**1A. Elements of Chemistry.**

Professor O'NEILL.

Lectures on the general principles of chemistry, illustrated with experiments.

2 hrs., first half-year. Tu Th, 10.

**1B. Elements of Chemistry.**

Professor O'NEILL.

Continuation of above course, with special reference to the applications of chemistry.

2 hrs., second half-year. Tu Th, 10. Prerequisite: Chemistry 1A.

*Major Courses.*

**7A. Inorganic Chemistry.**

Professor RISING.

Advanced lectures on the chemistry of the metals, designed particularly for mining students.

2 hrs., throughout the year. M F, 11.

**\*7B. Inorganic Chemistry: Laboratory.**

Professor RISING.

A few students will be admitted to this course, and will be assisted in making special preparation of metallic compounds. Competent students will be able to pass to original investigation. The credit value will be fixed in each case.

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\* Not to be given in 1907-08.

**9A. Organic Chemistry.**

Assistant Professor BIDDLE.

Advanced course. Chemistry of the aliphatic derivatives. Lectures and recitations, with references to original articles on special topics.

3 hrs., first half-year. M W F, 9. Prerequisite: Courses 8A and 8B.

**9B. Organic Chemistry.**

Assistant Professor BIDDLE.

Advanced course. Chemistry of the aromatic derivatives and cyclic compounds in general. Lectures and recitations, with references to original articles on special topics.

3 hrs., second half-year. M W F, 9. Prerequisite: Courses 8A and 8B.

**10A. Laboratory: Organic.**

Assistant Professor BIDDLE.

Supplementary to Courses 8A, 8B, 9A, and 9B. Prescribed, Junior year, in the College of Chemistry. Preparation of organic compounds, and methods of analysis. Prerequisite: Course 8A. Course 8B should also precede or accompany this course.

9 hrs., either half-year; 3 units. M W F, 1-4.

**10B. Laboratory: Organic.**

Assistant Professor BIDDLE.

Continuation of Course 10A.

6 to 15 hrs., either half-year; 2 to 5 units.

**11A. Physical Chemistry.**

Assistant Professor COTTRELL.

A discussion of the fundamental principles of Chemistry from the standpoint of thermodynamics and molecular theory, special emphasis being laid upon the topics of reaction velocity and equilibrium in homogeneous and heterogeneous systems.

2 hrs., throughout the year. Tu Th, 8. Prerequisite: Chemistry 5A or 5B and 8A; Physics 1, 3 and either 2A or 4; Mathematics, familiarity with the differential and integral calculus.

**11B. Electrochemistry.**

Assistant Professor COTTRELL.

The historical development and present state of electrochemical theories, with brief reference to their practical applications. Illustrated by lecture experiments.

3 hrs., first half-year. M W F, 8. Prerequisites: Same as for Course 11A.

**12A. Laboratory: Physical Chemistry.**

Assistant Professor COTTRELL.

A series of laboratory experiments in connection with Course 11A.

9 hrs., second half-year; 3 units. Tu W Th, 1-4. Prerequisites: Same as for Course 11A. Prescribed, Junior year, in the College of Chemistry.

**12B. Laboratory: Electrochemistry.**

Assistant Professor COTTRELL.

A series of laboratory experiments in connection with Course 11B.

6 or 9 hrs., second half-year; 2 or 3 units. Tu W Th, 1-4. Prerequisite: Same as for Course 11B.

**14A. Chemical Technology.**

Professor O'NEILL.

The chemistry and manufacture of the more important technical chemical products.

2 hrs., second half-year. Tu Th, 8. Prerequisite: Courses 9A or 9B, 10, and 11.

**14B. Chemical Technology: Laboratory.**

Professor O'NEILL.

Laboratory work supplementary to 14A.

6 hrs.; 2 units, second half-year. Tu Th, 1-4. Prerequisite: Same as for 14A, and 5 and 6.

**16. Ore Analysis.**

Assistant Professor BLASDALE.

Special method of analysis of minerals and ores of complex composition.

6 hrs., second half-year; 2 units. Tu Th, 1-4. Prerequisite: Courses 5A or 5B, and 6; Physics 3.

**17A. Chemistry of Structural Materials.**

Mr. BOOTH.

Chemical character and methods of manufacture of materials of construction.

2 hrs., first half-year. Tu Th, 4.

**23. Thermo-Chemistry.**

Professor RISING.

Lectures, with reference to the original literature. For graduates and advanced undergraduates. Prerequisite: Courses 8A and 11.

2 hrs., first half-year. Tu Th, 10.

**24. Selected Topics in Organic Chemistry.**

Assistant Professor BIDDLE.

Lectures, with references to original literature.

2 hrs., second half-year. Prerequisite: Courses 9A or 9B, and 10A.

**25. Explosives.**

**Professor RISING.**

2 hrs., second half-year. Tu Th, 10. Prerequisite: Courses 5A or 5B, and 6.

**26. Rare Metals.**

**Mr. BOOTH.**

Lectures and discussions on some of the more important rare elements.

2 hrs., second half-year. M, 4. Prerequisite: Course 5A or 5B.

**27. History of Chemistry.**

**Professor O'NEILL.**

The development of modern Chemistry.

2 hrs., first half-year. Tu Th, 10. Prerequisite: Courses 9A or 9B, 10A, 11.

**28. Teachers' Course.**

**Assistant Professor MORGAN.**

Training course for students intending to become teachers of chemistry. 4 hrs., throughout the year: 1 hour lecture, 1 period (3 hrs.) assisting in laboratory instruction, and 2 periods (6 hrs.) of laboratory work. The instruction will be participated in by all the department instructors. Prerequisite: Courses 5A or 5B, 8.

**29. Summer Course.**

A course of practical laboratory exercises especially adapted to the needs of teachers in the secondary schools of the State, supplemented by lectures upon the principles involved. [See Summer Session announcement.]

**30A. Special Undergraduate Study and Research.**

All special lecture courses not included in the courses announced above. Credit value to be fixed in each case.

**30B. Special Undergraduate Study and Research.**

All special laboratory work not included in the courses announced above. Credit value to be fixed in each case.

Courses under 30 and 31 are given by all instructors in the department, according to circumstances. See schedule of exercises.

**GRADUATE COURSES.**

**31. Graduate Course.**

Work adapted to the special needs of each student. Credit value to be fixed in each case.

**32. Thesis Work in Chemistry.**

The opportunities which the Department of Chemistry offers for graduate study may be stated as follows: (a) *Work in the Chemical Seminary*, including readings from the original literature, with criticisms, suggestions, and examinations, verifications of important statements, etc.; (b) *Investigations in the Chemical Laboratory*.

The Chemical Seminary is open to graduate students, and to advanced undergraduates who have made exceptional attainments. The meetings of the Seminary will be weekly, at which members will be required to present results of their study and investigation. These will be subject to criticism and inquiry.

Courses are so arranged that the assignment of work is individual and can be adapted to the special wants of the student. The progress of the student will be determined solely by his industry and ability to grasp the subject. The students and instructors of the department will meet in the Seminary and listen to the presentation and discussion of the results of study by the members. Special research work will be assigned to students, which they will be expected to carry out under the guidance of the Professor of Chemistry. This is regarded as the most important work of the student, and all possible help and encouragement will be given in carrying it out.

The laboratories are commodious and adapted to the work of research. The supply of modern apparatus is ample, and will be placed at the disposal of competent students.

The Library of the University, supplemented by the private libraries of the professors, will give the student access to practically the whole literature of the subject.

**COURSES IN OTHER DEPARTMENTS.****Agricultural Chemistry.**

See Agriculture, Horticulture, and Entomology.

**Assaying.**

See under Mining.

**Blowpipe Analysis.**

See under Mineralogy.

**BOTANY.**

WILLIAM A. SETCHELL, Ph.D., Professor of Botany.

WILLIS L. JEPSON, Ph.D., Assistant Professor of Botany.

WINTHROP J. V. OSTERHOUT, Ph.D., Assistant Professor of Botany.

HARVEY M. HALL, Ph.D., Instructor in Botany and Assistant Botanist to the Experiment Station.

TOWNSHEND S. BRANDEGEE, B.S., Honorary Curator in the Herbarium.

MAURICE B. NICHOLS, B.S., Assistant in Botany.

PHILIP S. THACHER, Jr., Reader in Botany.

C. A. PURPUS, Pharm.D., Botanical Collector.

GEORGE GRUBE, Janitor and Mechanical Assistant.

Courses 1, 2, and 3 are elementary courses and may be counted for prescribed science in the colleges of Letters, Social Sciences, and Natural Sciences. Course 14 is also elementary, but as it deals more largely with applied botany, it is recommended to students in the colleges of Commerce, Chemistry, and Agriculture. Courses 4 and 5 are of especial value to students of forestry. Courses 2 and 3 lead up to advanced work in the department of Botany. Those desiring the teacher's certificate are advised to take Courses 4, 5, and 9, with the prerequisites, but should consult with the head of the department early in their course. Lecture courses in Summer Session are equivalent to Course 1 in part, and credit will not be given for both.

A laboratory fee of two dollars and a half will be imposed each half-year for each laboratory course. This rule applies to Courses 2, 3, 5, 6, 7, 9, 11, 12, 13, 14, 25, 26, and 27.

**LOWER DIVISION COURSES.****1. Fundamentals of Botany.**

Professor SETCHELL.

Lectures, illustrated as far as possible by means of specimens, diagrams, and preparations; designed to set forth in a general way the important facts, problems, and theories with which botanical science is concerned.

3 hrs., throughout the year. Tu Th S, 8. (May also be taken either half-year.)

**2. General Plant Physiology.**

Assistant Professor OSTERHOUT and Mr. NICHOLS.

Experimental investigation of the fundamental life-processes of the plant, with especial reference to the relation of the plant to its environment.

6 hrs., second half-year; 3 units. Tu Th S, 8-10. Chemistry, at least Course 1, is strongly advised either before or in connection with this course.

**3. General Plant Morphology.**

Assistant Professor JEPSON and Mr. NICHOLS.

Morphological study of types of flowering plants, with especial reference to the organs of reproduction.

6 hrs., first half-year; 3 units. Tu Th S, 8-10.

**14. Economic Botany.**

Dr. H. M. HALL.

Laboratory work on the morphology, relationships, properties, and geographical distribution of the plant families which furnish important commercial products and agricultural crops, accompanied by lectures on the uses, origin, cultivation, collection, and commerce of plant products.

6 hrs., first half-year; 3 units. M W F, 8-10.

## UPPER DIVISION COURSES.

**4. General Phaenogamic Botany.** Assistant Professor JEPSON.

First half-year, forest botany: The habits of growth, structure, and classification of forest trees, especially those of California, accompanied by lectures upon the forest regions of North America. Second half-year, higher flowering plants: The structure, morphology, and relationships of the leading orders.

6 hrs., throughout the year; 3 units each half-year. Tu Th S, 10-12, with field work to be arranged. Prerequisite: Courses 2 and 3. Either half may be taken separately.

**5. General Cryptogamic Botany.**

Professor SETCHELL.

A general study of the orders of spore-bearing plants from the points of view of structure, development, and economic importance. Laboratory work and informal lectures.

6 hrs., laboratory, 1 hr. lecture, throughout the year; 3 units each half-year. Tu Th, 1-4. Prerequisite: Course 3.



**6. Phycology and Mycology.**

Professor SETCHELL.

Laboratory work upon the structure, development, and classification of the algae, fungi, and lichens, with informal lectures and the assignment of outside reading. Intended for students who desire some critical knowledge of the lower cryptogamous orders. To be offered in alternate years with Course 7.

6 hrs., throughout the year; 3 units each half-year. Hours to be arranged with the instructor. Prerequisite: Course 5.

**\*7. Pteridology and Bryology.**

Professor SETCHELL.

The structure, development, and classification of the higher cryptogams (hepatics, mosses, ferns, and fern allies) will be treated in the same way as the lower cryptogams in Course 6. To be offered in alternate years with Course 6.

6 hrs., throughout the year; 3 units each half-year. Prerequisite: Course 5.

**9. Vegetable Histology.**

Assistant Professor OSTERHOUT.

A laboratory course in the microscopical anatomy of the higher plants, treated with reference to function and the influence of environment. It includes practice in embedding, use of the microtome, staining on the slide, microchemical tests, etc. Laboratory work and lectures.

6 hrs., throughout the year; 3 units each half-year. M F, 1-4. Prerequisite: Courses 2 and 3.

**11. Vegetable Cytology.**

Assistant Professor OSTERHOUT.

The anatomy and physiology of the cell, including cell division, chromosome reduction, fertilization, and a consideration of heredity and development from the standpoint of cytology. Laboratory work and lectures.

6 hrs., throughout the year; 3 units each half-year. M F, 1-4. Prerequisite: Course 9.

**12. Morphology of the Compositae.** Assistant Professor JEPSON.

Studies in the general morphology of the group, followed by the critical examination of various West American genera.

6 hrs., throughout the year; 3 units each half-year. Tu Th S, 10-12. Prerequisite: Course 4.

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\* Not to be given in 1907-08.

**13. Taxonomy and Phylogeny of the Phaenogams.**

Assistant Professor JEPSON.

Laboratory work on the classification of the seed plants; considering the characters and affinities of the classes and more important orders, accompanied by informal discussions of phylogenetic problems.

6 hrs., throughout the year; 3 units each half-year. Tu Th S, 10-12. Prerequisite: Courses 4 and 5. To be offered in alternate years.

**GRADUATE COURSES.****25. Advanced Cryptogamic Botany.**

Professor SETCHELL.

The cryptogams of California offer exceptional opportunities for research, and many simpler problems are presented for original investigation. This work during the year will be confined almost exclusively to the algae, in connection with the special work of the instructor. Students should expect to devote considerable time to this course.

**26. Advanced Phaenogamic Botany.** Assistant Professor JEPSON.

Special problems requiring the original investigation of some particular order or smaller group of flowering plants. This course involves work in the field as well as in the laboratory.

**27. Advanced Histology and Cytology.**

Assistant Professor OSTERHOUT.

Special problems in histology and cytology will be assigned to properly prepared students. M F, 1-4.

**28. Advanced Economic Botany.**

Dr. H. M. HALL.

Special problems in agrostology (either systematic or economic) and other branches of economic botany.

6 hrs., throughout the year; 2 units each half-year. M W, 1-4. Prerequisite: Course 14.

**30. Botanical Seminar.**

Professor SETCHELL.

Assistant Professors JEPSON and OSTERHOUT.

Graduates and advanced undergraduates meet once or twice a month for the discussion of special topics.

**ZOOLOGY.**

WILLIAM E. RITTER, Ph.D., Professor of Zoology.

CHARLES A. KOFOID, Ph.D., Associate Professor of Histology and Embryology.

JOHN C. MERRIAM, Ph.D., Associate Professor of Palaeontology and Historical Geology.

HARRY B. TORREY, Ph.D., Assistant Professor of Zoology.

E. L. MICHAEL, B.S., Assistant in Zoology.

EDNA E. WATSON, M.S., Assistant in Zoology.

The courses are planned to meet the needs of three classes of students, *viz.*:

1. Those who wish, for general culture, some knowledge of the subject-matter, methods, and generalizations of biological science. For this class Courses 1, 2, 5, 6, 7, and 17, 18, 19, and 20 are particularly suited.

2. Those preparing to become teachers and investigators. For such the individual aims of the student will determine, after the fundamental courses have been taken, what advanced courses should be selected. The minimum for the recommendation for the teacher's certificate is 1, 2, either 4 or 5, 7 and 17.

3. Those preparing for the study of medicine. For these, Courses 1, 2, 4, and 5 or 6 are requisite to fulfill the requirements of the Pre-Medical Course.

A five-dollar deposit, with a refund of two dollars less breakage, is required for all laboratory courses.

**LOWER DIVISION COURSES.****1. The Fundamentals of Zoology.**

Professor RITTER,

Assistant Professor TORREY, and Mr. MICHAEL.

An introduction to the facts and principle of animal biology.

Lectures 3 hrs., demonstrations 3 hrs., first half-year; 4 units.

Lectures Tu Th S, 11. Demonstrations, Section I, 8-11 Tu;

Section II, 1-4 Tu; Section III, 8-11 Th; Section IV, 1-4 Th.

The practical work consists in examining and sketching living and prepared specimens and models. The aim is primarily information rather than discipline. No dissecting is done by the students. The demonstrations given in connection with Zoology 1

during the last five years have proved so useful that it is determined to make wider application of this form of instruction. Hereafter the introductory course will combine demonstrations with lectures for all students alike. By this not only will every student have an objective basis for the lectures heard, but those going on to laboratory courses will have become acquainted with a considerably larger number of animals and structures than the laboratory work can give.

## 2. **General Zoology.**

Assistant Professor TORREY.

Laboratory and recitations.

A study of the behavior, structure, and development of animal types.

9 hrs., second half-year; 4 units. Section 1, Tu W Th, 1-4; Section II, Tu Th S, 8-11. Prerequisite: Course 1.

## UPPER DIVISION COURSES.

## 4. **Comparative Anatomy of the Higher Vertebrates.**

Professor RITTER, Associate Professor MERRIAM, and Mr. MICHAEL.

A continuation of Course 2. Designed largely for students preparing to study medicine. The osteological part of the work is done under Associate Professor MERRIAM. (See Geology 11.)

8 hrs., first half-year; 4 units. Tu W Th, 1-4, and S, 8-12; each student to work any *three* of the *four* possible periods. Laboratory work, recitations, and assigned topics; allotment of time for each to be arranged with the class.

## 5. **Cytology.**

Associate Professor KOFOID and Miss WATSON.

Structure and activities of the cell. Cell-division, maturation and histogenesis of the sex cells, fertilization and cleavage. Relation of cytological phenomena to normal and abnormal growth, to sex, and to theories of heredity and evolution.

8 hrs., first half-year; 4 units. Lectures Tu Th, 9; laboratory Tu Th, 1-4. Prerequisite: Course 2.

## 5A. **Microscopical Technique.**

Associate Professor KOFOID and Miss WATSON.

Preparation of animal tissues for microscopical examination.

Use of microscope and microtome. Methods of fixation, sectioning, and staining. Laboratory and conferences.

3 or 6 hrs., either half-year; 1 or 2 units. Hours to be arranged on Tu Th. Prerequisite: Course 2 and Chemistry 3.

**6. Embryology.** Associate Professor KOFORD and Miss WATSON.

The phenomena of animal development, fundamental facts of reproduction, comparative vertebrate embryology. Lectures, recitations, and laboratory.

8 hrs., second half-year; 4 units. Tu Th, 9; Tu Th, 1-4. Prerequisite: Courses 2 and 3.

**7. Advanced Invertebrate Zoology.**

Associate Professor KOFORD and Miss WATSON.

Lectures, laboratory, and field work, with special reference to local fauna, both marine and fresh-water. May be taken independently of Course 7A.

7 hrs., first half-year; 3 units. Lectures W, 9; laboratory W, 1-4, and 3 hours to be arranged. Prerequisite: Course 3.

**7A. Advanced Invertebrate Zoology.**

Associate Professor KOFORD and Miss WATSON.

Lectures and laboratory work upon the morphology and taxonomy of lower invertebrates, with special reference to animal parasites. This course is especially designed for prospective students of medicine, and of veterinary and agricultural sciences.

7 hrs., second half-year; 3 units. Lectures W, 9; laboratory W, 1-4, and 3 hours to be arranged. Prerequisite: Course 3.

**9. Biological Examination of Water.**

Associate Professor KOFORD and Mr. —.

The biology of waters of reservoirs and streams, with especial reference to water supply and sewage disposal. A field and laboratory course dealing with the microscopic organisms of fresh water, other than bacteria, their occurrence, distribution, and control, and their relation to problems of sanitary engineering.

3 hrs., second half-year; 1 unit. F, 1-4. Prescribed, in the second year of the Sanitary Course, College of Civil Engineering.

**\*11. Advanced Cytology.**

Associate Professor KOFORD.

A continuation of Course 5. Mendelism, sex determination, reduction in sex cells, with especial reference to biological theories. Given in alternate years at option of instructor.

Second half-year; 3 units. Laboratory, lectures, and thesis. Hours to be arranged.

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\* Not to be given in 1907-08.

**17. Advanced General Vertebrate Zoology.** Professor RITTER.

An extension in the direction of systematic and ecological Zoology of Course 2. The work is confined mostly to the birds, reptiles, and amphibians of California. Recitations, field and laboratory work, and papers on assigned topics.

3 units, second half-year. Th, 1-4; S, 8-12. Prerequisite: Course 2.

**18. Experimental Zoology.** Assistant Professor TORREY.

An examination of selected problems involved in the interpretation of organic forms.

2 hrs., first half-year. Tu Th, 11. Prerequisite: Course 2.

**19. Marine Biology.** Professor RITTER,  
Associate Professor KOFID, and Assistant Professor TORREY.

General lectures on various aspects of the life of the sea, with special reference to the investigations being carried on at the La Jolla Marine Station.

1 hr., second half-year. M, 4. Without prerequisites, and without credit unless accompanied by prescribed reading and topical study previously arranged for with the head of the department. 1 unit.

**20. Evolution.** Professor RITTER.

An historical and critical review, with forecast of the probable future of the doctrine.

2 lectures and 1 conference a week, first half-year; 3 units. M W F, 3. Room 26, East Hall.

Open to Upper Division students, whether trained in Biology or not.

A printed synopsis of the course will be furnished.

**GRADUATE COURSES.****8. Seaside Laboratory.**

During the summer vacations, work in zoology is transferred to the seashore, and, as far as possible, the work done there is made an integral part of the work of this department of the University. The marine work is conducted in the new laboratory located at La Jolla, and is devoted exclusively to research and advanced individual instruction. Applications for admission to the laboratory should be made, whenever possible, prior to May 1.

10. **Research Work.** Professor RITTER,  
Associate Professor KOFOID, and Assistant Professor TORREY.  
Original study on special topics, in the field and laboratory.
- \*11. **Advanced Cytology.** Associate Professor KOFOID.  
A continuation of Course 5. Mendelism, sex determination, reduction in sex cells, with especial reference to biological theories.  
Given in alternate years at option of instructor.  
Second half-year; 3 units. Laboratory, lectures, and thesis.  
Hours to be arranged.
12. **Zoological Seminar.** Assistant Professor TORREY.  
Designed for the discussion of special topics, including the more important contemporaneous advances in this field of science.  
A reading knowledge of German or French is essential.  
1 hr., throughout the year.

The work done during the last few years on the marine invertebrate fauna of the Pacific Coast has served to reveal more and more clearly the richness, in many respects unique, of the opportunities here afforded for making important contributions to zoological science.

The museum collections are all accessible to students pursuing advanced studies, and are particularly valuable to those pursuing investigations in marine zoology.

The results of studies carried sufficiently far to make them distinctly contributions to the science may be published in the University of California Publications in Zoology.

#### COURSES IN OTHER DEPARTMENTS.

**Entomology.** (See under Agriculture.)

**Palaeontology.**

Courses 5A and 6A (see Geology) may be taken as advanced work in Zoology by special arrangement with the department.

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\* Not to be given in 1907-08.

**PHYSIOLOGY.**

JACQUES LOEB, M.D., Professor of Physiology.

ALONZO ENGLEBERT TAYLOR, M.D., Professor of Pathology.

FRANK W. BANCROFT, Ph.D., Assistant Professor of Physiology.

SAMUEL STEEN MAXWELL, Ph.D., Assistant Professor of Physiology.

T. BRAILSFORD ROBERTSON, Ph.D., Instructor in Physiology.

THEODORE C. BURNETT, M.D., Assistant in Physiology.

— — —, Assistant in Physiology.

J. W. ALLEN, B.S., Assistant in Physiology.

The courses in physiology are arranged to meet the needs of several classes of students.

For the general student, who wishes to obtain some elementary information concerning the subject-matter and methods of physiology, Course 1 is offered.

For the medical student, a series of courses is given which is similar to the courses in physiology generally offered in the medical schools.

Students electing physiology as a minor subject for the degree of Ph.D. should take Courses 2, 3, 4, and 5, and, in addition, the Seminar.

Finally, attention should be called to the fact that the equipment of the department offers unusual opportunities for research, both in the Rudolph Spreckels Laboratory at Berkeley and in the Herzstein Research Laboratory at New Monterey.

**LOWER DIVISION COURSE.****1. Introduction to Experimental Biology.**

Dr. ROBERTSON.

Illustrations of life phenomena. Laboratory with occasional lectures.

6 hrs., second half-year; 3 units. W F, 1-4.



UPPER DIVISION COURSES.

2. **General Physiology and Experimental Biology.**

Professor LOEB, Assistant Professor BANCROFT,  
and Dr. BURNETT.

General theory of life phenomena. Lectures and laboratory.

The lectures may be taken without the laboratory.

12 hrs., first half-year; 6 units. Prerequisite: Physics 1, and Chemistry 1 and 3. Lectures Tu Th S, 11; laboratory Tu Th S, 8-11. Prescribed, Freshman year in the College of Medicine.

3. **Physiological Chemistry.**

Professor TAYLOR.

Physiology of digestion, metabolism, and animal heat. Lectures and laboratory.

12 hrs., first half-year; 6 units. M W F, 1-5. Prescribed, Freshman year in the College of Medicine.

4. **Physiology of Blood, Circulation, Respiration, Muscle, Nerve, Secretion, and Reproduction.**

Dr. ROBERTSON.

12 hrs., first half-year; 6 units. Lectures Tu Th S, 8; laboratory Tu Th S, 9-12. Prerequisite: Physiology 2 and 3. Prescribed, Sophomore year in the College of Medicine.

5. **Physiology of the Nervous System and Special Senses.**

Assistant Professor MAXWELL.

12 hrs., first half-year; 6 units. Lectures and laboratory M W F, 1-5. Prescribed, Sophomore year in the College of Medicine.

11. **Advanced Physiology.**

First half-year, Professor LOEB; second half-year, Assistant Professor BANCROFT, Assistant Professor MAXWELL, and Dr. ROBERTSON.

Laboratory work three afternoons a week, with occasional lectures. May be taken either by students who have had adequate training in botany and zoology, or by those who have had adequate preparation in chemistry and physics. Students who wish to take the course should apply personally to the instructors.

12. **Research Work in Physiology.**

Professor LOEB.

Students who wish to take this course should apply personally to Professor LOEB.

13. **Seminar.**

Professor LOEB.

First half-year. M, 4-5. Open to students of Courses 2, 3, 4, 5, 11, and 12.

**HYGIENE.**

\*GEORGE F. REINHARDT, B.S., M.D., Professor of Hygiene and Medical Examiner.

CHARLES R. GREENLEAF, M.D., Brig. Gen. U. S. A., retired, Honorary Professor of Military and Public Hygiene.

ARCHIBALD R. WARD, B.S.A., D.V.M., Assistant Professor of Bacteriology and Director of the State Hygienic Laboratory.

ALLAN F. GILLIHAN, M.D., Medical Examiner.

ELEANOR STOW BANCROFT, M.D., Lecturer in Hygiene and Medical Examiner of Women.

MARGARET HENDERSON, B.S., Assistant in the State Hygienic Laboratory.

ETHEL SHERMAN, Superintendent of the Infirmary.

All students who have been absent from classes on account of illness are required to report themselves to one of the Medical Examiners, and to obtain the Medical Examiner's certificate before returning to the University.

**LOWER DIVISION COURSES.****1. General Hygiene.**

Professor REINHARDT, Dr. GILLIHAN, and Dr. E. S. BANCROFT.

Lectures on personal hygiene, first aid to the injured, and general sanitation, including the consideration of infectious diseases, and the problems of public health protection.

Two sections. Section I, for men, first half-year, Dr. GILLIHAN; second half-year, Professor REINHARDT, 1 hr., throughout the year. F, 4. Section II, for women, Dr. BANCROFT, 2 hrs., first half-year. Tu Th, 11. Prescribed to all undergraduates during their first year of residence.

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\* Absent on leave, first half-year, 1907-08.

## UPPER DIVISION COURSES.

**2. Bacteriology.**

Assistant Professor WARD.

This course is designed during the first term to provide the student with an elementary knowledge of bacteria and of the laboratory methods of studying them. In the second term, a detailed study will be made of some pathogenic organisms of importance in human and veterinary medicine.

7 hrs., throughout the year; 3 units, each half-year. Lecture M, 2, and 6 hours of laboratory work at periods to be arranged.

**3. Advanced Bacteriology.**

Assistant Professor WARD.

Advanced study preparatory to and including investigation of special problems in pathological and dairy bacteriology. Conferences, laboratory, and topical readings.

Prerequisite: Course 2, or its equivalent. Credit and hours to be arranged.

**4. Bacteriology of Water and Sewage.** Assistant Professor WARD.

General elementary bacteriology with the application of bacteriological methods in the examination of water and sewage. Prescribed, Junior year in the Sanitary Course, College of Civil Engineering.

7 hrs., first half-year; 3 units. Lectures and 6 hours' laboratory work at hours to be arranged.

**GEOLOGY.**

ANDREW C. LAWSON, Ph.D., Professor of Geology and Mineralogy.

JOHN C. MERRIAM, Ph.D., Associate Professor of Palaeontology and Historical Geology.

GEORGE D. LOUDERBACK, Ph.D., Associate Professor of Geology.

HARRY O. WOOD, M.A., Instructor in Mineralogy and Geology.

ESPER S. LARSEN, Jr., B.S., Instructor in Geology and Mineralogy.

There are no laboratory deposits in this department.

**LOWER DIVISION COURSES.****1A. General Geology: Dynamical and Structural.**

Professor LAWSON.

Lectures.

3 hrs., first half-year. M W F, 10. Prerequisite: Elementary chemistry and physics. Prescribed, Senior year, in the Railroad and Sanitary Courses, College of Civil Engineering; and Junior year, in the College of Mining.

NOTE.—Students intending to make Geology a major study in the later years of their course are advised to take this course as early as possible.

**1B. General Geology: Historical.** Associate Professor MERRIAM.

Lectures.

2 hrs., second half-year. Tu Th, 10. Prerequisite: Course 1A or 5.

**5. General Palaeontology.** Associate Professor MERRIAM.

The general principles of the study of fossil organisms.

2 hrs., first half-year. Tu Th, 10. Preparatory to Geology 1B. Recommended as preliminary: Zoology 1A.

UPPER DIVISION COURSES.

**2. Field Geology.**

Professor LAWSON and Associate Professor LOUDERBACK.

An inquiry by the student into the geological conditions which obtain in the region around the Bay of San Francisco, with occasional more extended excursions to points of especial interest; training in methods of field-observation and in interpretation of results.

1 unit, first half-year; 2 units, second half-year. Year course; fifteen field-days during the year. Prerequisite: Senior standing; Course 1A in Geology; Course 1 in Mineralogy. Prescribed, Senior year, in the College of Mining. Students taking this course may be called upon to make excursions entailing an outlay for traveling expenses of \$20.

**2A. Economic Geology.**

Professor LAWSON.

Lectures.

3 hrs., second half-year. M W F, 10. Prerequisite: Geology 1A and Mineralogy 1. Prescribed, Senior year, in the College of Mining.

**3. Petrography.**

Professor LAWSON.

Principles and methods of investigation of rock-forming substances, with special discussion of the most important ones. General petrology. Systematic petrography.

2 hrs., first half-year. Tu Th, 11. Prerequisite: Course 1A; Courses 2 and 3A in Mineralogy. Prescribed, Senior year, in the College of Mining.

**4. Petrographical Laboratory.**

Associate Professor LOUDERBACK, Mr. WOOD, and Mr. LARSEN.

(a) Demonstrations of the different methods of investigation of the rock-forming minerals and rocks. (b) Practice in the determinations of rocks by modern petrographical methods; preparation of thin sections, and the use of the polarizing microscope.

3 hrs., first half-year; 1 unit; 6 hrs., second half-year; 2 units.

First half, Section I, M, 1-4; II, W, 1-4; III, F, 1-4. Second half, Section I, M, 1-4; W, 1-3; II, W, 3-5; F, 1-4. Prerequisite: Course 1A in Geology; Courses 2 and 3A in Mineralogy. Prescribed, Senior year, in the College of Mining.

- 7. Physical Geology of North America.** Professor LAWSON.  
Lectures.  
2 hrs., second half-year. Tu Th, 11. Prerequisite: Course 1A in Geology, and Course 1 in Mineralogy.
- 5A. Invertebrate Palaeontology.** Associate Professor MERRIAM.  
A laboratory study of the most important forms of fossil invertebrates.  
4 hrs., first half-year; 2 units. M W, 1-4. Prerequisite: Course 5 completed, or in progress.
- 6A. Practical Work in Palaeontological Geology.**  
Associate Professor MERRIAM.  
Given in connection with Course 1B. Laboratory work and excursions. For the purpose of studying the fossils and geological horizons of the Coast Ranges in the field, excursions to points of interest near Berkeley are made on convenient Saturdays during the term.  
4 hrs., second half-year; 2 units. (1 unit laboratory, 1 unit excursion.) Open to students who have completed or are taking Course 1B.
- 11. Vertebrate Palaeontology.** Associate Professor MERRIAM.  
Comparative osteology, history, and affinities of the most important types of recent and fossil vertebrates.  
3 hrs., first half-year. Lectures, M W, 9; laboratory work, W or F, 1-4. Prerequisite: Course 5 in Geology, or Course 1A in Zoology.

**Geological History of Man.** (See Anthropology 4.)

Associate Professor MERRIAM.

## GRADUATE COURSES.

- 8. Advanced Palaeontological Laboratory.**  
Associate Professor MERRIAM.  
Studies in lines of descent. Practical work in the palaeontology and organic geology of California.  
Throughout the year. Credit value to be determined in each case. Prerequisite: Course 5A or 11.

**10. Inorganic Geology.**

Professor LAWSON.

Discussions of special topics and advanced problems. Critical reviews of current literature. Prosecution of original geological research and publication of results. Methods of geological surveying and cartography. Petrographical studies.

**9. Geology of California.**

Associate Professor LOUDERBACK.

Lectures outlining the geological history of sedimentation, volcanic activity, the major earth movements, and geographical changes in California and bordering territory. Studies in the literature, and preparation of reports on special topics.

2 hrs., first half-year. M W, 3 (hours may be changed to suit class). Open to graduates and seniors who have creditably completed 1A and either 1B or 7.

For purposes of training in research, there is probably nowhere a more inviting geological field than that which lies immediately at the gates of the University of California. In nearly all departments of geology the problems offered to the students are varied and interesting. In the treeless region between Berkeley and Mt. Diablo, and on the San Francisco and Marin peninsulas, there are magnificent illustrations of mountain structure, and the opportunities for acquiring skill in stratigraphy and in the interpretation of structural phenomena could scarcely be surpassed. The strata of the region are replete with Cretaceous and Tertiary fossils. The igneous rocks range in character from the most acid to the most basic, and include plutonic intrusives, dykes, and volcanic flows. In themselves and in the metamorphic contact zones, which they have developed in the adjoining country rock, they afford to the student of petrography abundant material for study. In dynamic geology the operation of wave, wind, and stream in the evolution of geomorphic form, is finely illustrated, as are, also, the phenomena due to vertical oscillations of the coast. The facilities for local field work are ample. The region adjacent to the Bay of San Francisco, from Mount Hamilton northward, is being mapped topographically by the United States Geological Survey, and excellent contour maps are becoming available as the work proceeds. These maps are made the basis of instruction in geological cartography.

In the wider field of the entire State, many broad and philosophic problems in geological science grow upon the student as he becomes familiar with the structure and physiography of the country. Movements of vast extent have occurred on the western margin of the continent in the most recent times, and the conditions

for their study are most favorable. Such questions as are involved in the doctrine of isostasy and in the theories of orogeny and epeirogeny are constantly suggested to the student by his environment. The new science of geomorphology could scarcely find a more promising field for the concrete illustration of its principles. In the Sierra Nevada, studies in glaciology may be pursued to great advantage. In petrology and mineralogy a large and inviting field awaits the investigator. The economic geology of the State has as yet been but partially studied.

In palaeontology and historical geology, California offers unlimited material to the student desirous of engaging in research. Almost the entire geological column from the Cambrian to the Quaternary is represented by fossiliferous horizons; and, although valuable contributions to the palaeontology of the State have been made by Conrad, Gabb, and others, many of the more important problems relating to the geological positions and faunal relations of the California formations are still unsolved.

The laboratories and museums of the department are well equipped for research, and new materials and apparatus are being added yearly. A collection of minerals comprising nearly 20,000 specimens is at the disposal of the student. The petrographical collections contain representatives of nearly all the rock types.

The collection of fossils in the departmental museum represents fully the development of invertebrate life, and as a working collection is excelled by few in America. Important collections of vertebrate fossils have been made by University expeditions to the John Day region of Oregon and to northern California. The material collected by the State Geological Survey, including the majority of Gabb's types, is in the collection, furnishing an almost complete set of species for comparison.

The activity in research during the past few years has led to the establishment of the BULLETIN OF THE DEPARTMENT OF GEOLOGY, of which seventy-four numbers have been issued, comprising some two thousand octavo pages.

Professor LAWSON conducts graduate work in inorganic geology, including discussions of special topics and advanced problems, critical reviews of current literature, prosecution of geological research, with a view to publication of results, methods of geological surveying and cartography, and petrographical studies.

Professor MERRIAM conducts advanced instruction and research in palaeontology. Particular attention is given to the investigation of problems in the palaeontologic geology of the Pacific Coast.



**MINERALOGY.**

ANDREW C. LAWSON, Ph.D., Professor of Geology and Mineralogy.

ARTHUR S. EAKLE, Ph.D., Assistant Professor of Mineralogy.

HARRY O. WOOD, M.A., Instructor in Mineralogy and Geology.

ESPER S. LARSEN, Jr., B.S., Instructor in Geology and Mineralogy.

A laboratory deposit of five dollars a year is required for Course 1, to cover cost of materials actually used and breakage of apparatus. Deposits are not required for other courses in this department.

**LOWER DIVISION COURSES.****1. Mineralogical Laboratory.**

Assistant Professor EAKLE, Mr. WOOD, and Mr. LARSEN.

The course comprises two parts: (a) Practice in the determination of unlabeled minerals by means of their physical properties, the apparatus consisting of pen-knife, pocket lens, streak plate, and magnet. The object is to give the student sufficient familiarity with the most commonly occurring minerals of geological and economic importance to enable him to recognize or determine them in the field without delay. (b) The latter half of the course is devoted to the determination of minerals by blowpipe analysis.

6 hrs., throughout the year; two units each half-year. Three sections: I, Tu Th, 9-12; II, Tu Th, 1-4; III, M F, 1-4. Prerequisite: Matriculation chemistry. Elective, in the Railroad Course, College of Civil Engineering, with Mechanical Engineering 8A and 8B. Prescribed, Sophomore year, in the College of Mining; in the Sanitary and Irrigation Courses, College of Civil Engineering, first half-year.

**UPPER DIVISION COURSES.****2A. Crystallography.**

Assistant Professor EAKLE.

The morphology of minerals.

2 hrs., first half-year. Tu Th, 10. Prerequisite: Junior standing. Prescribed, Junior year, in the College of Mining.

**2B. Crystallographical Laboratory.** Assistant Professor EAKLE.

2 hrs., first half-year. Two sections. M W, 1-3. Given as part of Course 2A, and required of students who are taking that course.

**3A. Physical Properties of Minerals.** Assistant Professor EAKLE.

Lectures.

1 hr., second half-year. M W F, 9, preceding Course 3B. Prerequisite: Courses 2A and 2B. Prescribed, Junior year, in the College of Mining.

**3B. Descriptive Mineralogy.** Assistant Professor EAKLE.

A discussion of the salient properties and mode of occurrence of the more important minerals, with a classification of the same in natural groups; illustrated by typical specimens.

2 hrs., second half-year. M W F, 9. Prerequisite: Courses 1 and 2. Prescribed, Junior year, in the College of Mining.

**Petrography.**

See Courses 3 and 4 under Geology.

**GRADUATE COURSES.****5. Graduate Course.** Assistant Professor EAKLE.

Studies in the goniometrical investigation of crystals and in the determination of their physical constants. The acquiring of a wider and more thorough knowledge of minerals than is possible in the undergraduate course.

**MECHANICAL AND ELECTRICAL ENGINEERING.**

CLARENCE L. CORY, M.M.E., John W. Mackay, Jr., Professor of Electrical Engineering.

FREDERICK G. HESSE, Professor of Hydraulics, Emeritus.

\*JOSEPH N. LECONTE, M.M.E., Assistant Professor of Mechanical Engineering.

HERMAN W. REYNOLDS, B.S., Assistant Professor of Mechanical Engineering.

GROVER C. NOBLE, B.S., Assistant Professor of Electrical Engineering.

— — —, Instructor in Electrical Engineering.

— — —, Assistant in Mechanical Engineering.

GEORGE E. COX, Assistant in Mechanics and Foreman of Woodwork.

JAMES GEORGE, Assistant in Mechanics and Foreman of Ironwork.

ALEXANDER D. WHITE, Store-keeper and Machinist.

Laboratory deposits in this department are at the rate of five dollars a half-year for each laboratory or mechanical practice exercise a week. The average amount returned to the student at the end of the half-year is about two-fifths of the deposit.

**2. Hydrodynamics.**

Investigation of the action of forces producing equilibrium or motion in liquids; pressure, stability, flow, etc., as affected by gravity, inertia, outer and inner friction. General theory and construction of hydraulic motors and pumping machinery.

3 hrs., first half-year. M W F, 9. Prerequisite: Physics 5. Prescribed, Senior year, in the Colleges of Mechanics and Mining.

**3. Hydraulic Machinery.**

Assistant Professor LECONTE.

Discussion of such machines and apparatus as operate through the agency of fluids, either in modifying motion or transmitting power.

3 hrs., second half-year. M W F, 9. Prerequisite: Course 2. Prescribed, Senior year, in the College of Mechanics; and in the Sanitary Course, College of Civil Engineering.

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\* Absent on leave, first half-year, 1907-08.

**4A. Kinematics.** Assistant Professor LECONTE and Mr. —.

*Theoretical:* Treatment of motion without reference to the cause which produces it, comprehending the study of pure mechanism, or the mutual dependence of the movements in the parts of a machine. *Applied:* Application of the preceding to the various kinematic problems connected with machine design and construction, such as link-motion, transmission by rolling and sliding contact, teeth of wheels, cams, form and proportions of the steam engine and other motors.

2 hrs., throughout the year. W F, 8. Prerequisite: Physics 5.

Prescribed, Senior year, in the College of Mechanics, and in the Sanitary Course, College of Civil Engineering.

**4B. Kinematics.** Assistant Professor LECONTE.

Draughting and designing; to be taken only in connection with Course 4A.

3 hrs., second half-year; 1 unit. W, 1-4. Prescribed, Senior year, in the College of Mechanics.

**5A. Thermodynamics.** Assistant Professor REYNOLDS.

Relations between heat and mechanical energy. Thermal properties of perfect gases, saturated vapors, and superheated vapors.

3 hrs., first half-year. M W F, 10. Prerequisite: Physics 5. Prescribed, Senior year, in the College of Mechanics.

**5B. Heat Engines: Testing, Construction, and Operation.**

Assistant Professor REYNOLDS.

Analysis of the cycles of steam, gas, oil, and air engines, and of refrigerating machinery, by means of the pressure, volume, and temperature; entropy diagrams. Discussion of the effects of compounding, jacketing, reheating, and superheating. Steam boilers, gas engines, gas producers, air compressors, and steam turbines. Methods of testing. Engine and boiler accessories.

3 hrs., second half-year. M W F, 10. Prerequisite: Course 5A. Prescribed, Senior year, in the College of Mechanics.

**7A. Mechanical Laboratory: Experimental Engineering.**

Assistant Professor LECONTE and Mr. —.

Experiments in hydraulics.

3 hrs., throughout the year; 1 unit each half-year. Tu, 1-4. Prescribed, Senior year, in the Mechanical Course, College of Mechanics.

**7B. Mechanical Laboratory: Experimental Engineering.**

Assistant Professor REYNOLDS and Mr. —.

Calibration of instruments, indicator springs, gauges, etc. Efficiency tests of simple steam engine, steam pump, injector, condenser, steam boiler, hot-air engine, gas engine. Valve-setting experiments. Quality of steam by separating, throttling, and barrel calorimeters. Tests of strength of materials. Viscosity and flash tests of oils. Coal calorimetry. Flue-gas analysis. Tests of complete power plants.

3 hrs., throughout the year; 1 unit each half-year. Th, 1-4. Prescribed, Senior year, in the Mechanical Course, College of Mechanics.

**8A. Mechanical Practice.**

Mr. Cox.

Shop work in wood, including pattern-making.

6 hrs., first half-year; 2 units. Section I, M F, 1-4; II, Tu Th, 9-12; III, Tu Th, 1-4; IV, W, 1-4, and S, 8-11. Prescribed, Sophomore year, in the College of Mechanics. Elective with Mineralogy 1, Sophomore year, in the Railroad Course, College of Civil Engineering.

**8B. Mechanical Practice.**

Mr. Cox.

Continuation of Course 8A.

6 hrs., second half-year; 2 units. Section I, M F, 1-4; II, Tu Th, 9-12; III, Tu Th, 1-4. Prescribed, Sophomore year, in the College of Mechanics. Elective with Mineralogy 1, Sophomore year, in the Railroad Course, College of Civil Engineering.

**9A. Mechanical Practice.**

Mr. GEORGE.

Shop work in iron, including machine work.

6 hrs., first half-year; 2 units. Section I, M F, 1-4; II, Tu Th, 9-12; III, Tu Th, 1-4; IV, W, 1-4, and S, 8-11. Prerequisite: Course 8A or 8B. Prescribed, Junior year, in the College of Mechanics.

**9B. Mechanical Practice.**

Mr. GEORGE.

Continuation of Course 9A.

6 hrs., second half-year; 2 units. Section I, Tu Th, 9-12; II, Tu Th, 1-4; III, M F, 1-4. Elective with Physics 7, Junior year, in the College of Mechanics.

**10A. Electrical Machinery and Construction.**

Assistant Professor NOBLE.

Discussion of the construction and operation of electrical machinery, and its application to electric lighting and power distribution. The location and construction of electric lighting and power systems for cities, street railways, and mines.

2 hrs., throughout the year. Tu Th, 11. Prerequisite: Mathematics 3B and Physics 2A and 3. Prescribed, Junior year, in the College of Mechanics.

**10B. Electrical Machinery and Construction.**

Laboratory tests.

Assistant Professor NOBLE.

6 hrs., second half-year; 2 units. This course cannot be taken except in conjunction with Course 10A. Prescribed, Junior year, in the College of Mechanics.

**11A. Alternating Currents and Alternating-Current Machinery.**

Professor CORY.

The theory of the generation of single-phase and poly-phase alternating currents, the use of the complex quantity, and the calculation of the regulation and behavior of alternating-current apparatus and transmission lines.

4 hrs., first half-year. Tu Th, 9-11. Prescribed, Senior year, in the Electrical Course, College of Mechanics. Prerequisite: Courses 10A and 10B, and Physics 5 and 7.

**11B. Alternating Currents and Alternating-Current Machinery.**

Professor CORY.

The theory of the single-phase and poly-phase induction motor, synchronous motor, and rotary converter, and their effects and operation in transmission systems.

4 hrs., second half-year. Tu Th, 9-11. Prerequisite: Courses 10A and 10B and Physics 5 and 7. Prescribed, Senior year, in the Electrical Course, College of Mechanics.

**11C. Alternating Currents and Alternating-Current Machinery:  
Laboratory.**

Practice in the laboratory, illustrating the work of the classroom.

6 hrs., throughout the year; 2 units each half-year. Section I, M Tu, 1-4; II, Th F, 1-4. Prerequisite: Courses 10A and 10B and Physics 5 and 7. Prescribed, Senior year, in the Electrical Course, College of Mechanics.

**14. Thesis for B.S. Degree in Mechanics.**

GRADUATE COURSES.

Graduate students who wish to engage in advanced work in hydraulics, thermodynamics, experimental engineering, electrical engineering, or related subjects, will be admitted to any of the courses offered, on giving evidence that they possess the fundamental knowledge which will enable them to do justice to the instruction. They will also be given all possible assistance outside the lecture room in the pursuit of advanced study and original investigation. A well equipped building is devoted to the work of these branches of engineering.

**12c. Electrical Engineering: Laboratory.**

Professor CORY, Assistant Professor NOBLE, and Mr. —.

Special tests and laboratory work.

Hours and credit value to be arranged.

**13. Hydraulics: Advanced Course.**

Professor HESSE.

Discussion of special problems in hydraulics.

Hours and credit value to be arranged.

**CIVIL ENGINEERING.**

\*FRANK SOULÉ, Graduate U. S. Military Academy, Professor of Civil Engineering.

HERMANN SCHUSSLER, Honorary Professor of Water-Supply Engineering.

CHARLES DERLETH, Jr., C.E., Associate Professor of Structural Engineering.

CHARLES G. HYDE, C.E., Associate Professor of Sanitary Engineering.

LOREN E. HUNT, B.S., Lecturer in Civil Engineering.

FRED H. TIBBETTS, B.S., Instructor in Civil Engineering.

ALFRED K. McCAMPBELL, Instructor in Civil Engineering.

WILLIAM C. WILLARD, C.E., Instructor in Civil Engineering.

**LABORATORY FEES.**

Laboratory fees are five dollars a half-year for laboratory Course 8B, three dollars for 1B and 2B, and ten dollars each for 8C, 3A, and 3B.

1. **Plane Surveying; in two parts, 1A and 1B.**

1A. **Surveying Theory.**

Mr. TIBBETTS, Mr. McCAMPBELL, and Mr. WILLARD.

Theory of surveying; modern surveying instruments, methods employed in topographic, land, city, mining, and hydrographic surveys, and in making maps and calculations from field-notes. Fully illustrated by practical problems. Lectures and recitations.

2 hrs., throughout the year. Sections I, II, M F, 8; III, IV, V, and VI, Tu Th, 8; VII, W S, 8.

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\* Absent on leave, 1907-08; Professor Soulé's courses will be given by other members of the Department, as indicated.



**1B. Field Practice and Mapping.**

Mr. McCAMPBELL and Mr. WILLARD.

The adjustment of surveying instruments in the field. Special problems in the field, illustrating the use of chain, level, transit, and plane-table; special problems in the draughting-room, illustrating the methods of making maps from field-notes.

2 hrs., throughout the year; 1 unit each half-year. Section I, M, 1-4; II, Th, 1-4; III, Tu, 1-4; IV, W, 1-4.

NOTE.—1A and 1B are prescribed, Freshman year, in the Colleges of Engineering. Neither can be taken without the other. Prerequisite: Plane Trigonometry.

**1C. Topographical Signs.**

Mr. WILLARD.

Conventional signs for topography with pen and brush.

3 hrs., first half-year; 1 unit. M, 9. Prescribed, Sophomore year, in the College of Civil Engineering. Prerequisite: Free-hand Drawing.

**1D. Titles and Lettering. (Elective.)**

Mr. WILLARD.

Design and arrangement of titles for maps and other drawings.

3 hrs., throughout the year; 1 unit each half-year. F, 1-4. Prerequisite: Free-hand Drawing.

**UPPER DIVISION COURSES.****2A. Railway, Highway, and Canal Surveying.**

Mr. WILLARD.

Methods of making reconnaissance, preliminary, and location surveys for railways, highways, and canals; analytical and graphical calculations of earthwork, masonry, etc. Full illustration by practical problems. Lectures and recitations.

2 hrs., first half-year. W F, 9. Prerequisite: Courses 1A, 1B, and 3A. Prescribed, Junior year, in the College of Civil Engineering.

**2B. Railroad Field Practice.**

Mr. WILLARD.

The most simple parts of railroad surveying, such as running in curves, etc.

6 hrs., first half-year; 2 units. Section I, M F, 1-4; Section II, Tu Th, 1-4. Prerequisites: Courses 1A, 1B, and 3A. Prescribed, Junior year, in the College of Civil Engineering.

**2c. Railroad Engineering Office Practice.****Mr. WILLARD.**

The plotting of railroad maps and profiles; calculation of volumes in masonry and earthwork; tracing of maps and plans; draughting of timber and masonry railroad structures from field-notes.

3 hrs., second half-year; 1 unit. F, 1-4. Prescribed, Junior year, in the Railroad Course, College of Civil Engineering. Prerequisite: Courses 2A and 2B.

**3A. Summer Class in Field Practice and Mapping.****Mr. TIBBETTS, Mr. MCCAMPBELL, Mr. WILLARD, and Assistants.**

For four weeks immediately following Commencement, an extended survey of a suitable tract in the vicinity of Berkeley is made. A camp is established in the country, and work is carried on, as far as possible, just as in actual practice. Theoretical study is more fully illustrated by continuous field work than it can be during the regular University term. A general survey, illustrating methods of topographic, city, and mine surveying, is made. All field-notes are completely worked up in the office, and embodied in maps, computations, etc. 3 units credit.

Prerequisite: Course 1. Prescribed, at the end of the Freshman year, in the Colleges of Engineering. No substitute for this course will be accepted.

**3B. Summer Class in Railroad Field Practice and Mapping.****Mr. TIBBETTS, Mr. MCCAMPBELL, Mr. WILLARD, and Assistants.**

Given concurrently with 3A. The survey of a railroad line, illustrating methods of making preliminary, location, and construction surveys. All field-notes are completely worked up in the office, and embodied in maps, computations, estimates, etc. 3 units.

Prerequisite: Course 2A. Prescribed, at the end of the Junior year, in the College of Civil Engineering. No substitute for this course will be accepted from students taking the Railroad Course. In the Summer Class of 1907, Sanitary and Irrigation students may substitute a canal survey.

**4. Railroad Economics.****Mr. WILLARD.**

Discussion of the theory of economic location and construction of railroads, based upon a study of operating expenses, rise and fall, distance, alignment, grades, etc.

2 hrs., second half-year. Tu Th, 9. Prerequisite: Course 2A. Prescribed, Junior year, in the Railroad Course, College of Civil Engineering.

**5. Higher Surveying.****Mr. WILLARD.**

Discussion of the figure of the earth, the measurement of base lines, and the methods of observing and making reductions in triangulation, of mapping of large areas, and of trigonometric and precise spirit leveling.

2 hrs., second half-year. W F, 9. Prerequisite: Course 1; Mathematics 3B and 10; Astronomy 7 and either 4A or 4B. (Also open to students who take Astronomy 4A or 4B concurrently, and who have the other prerequisites). Prescribed, Senior year, in the Railroad Course, College of Civil Engineering.

**6. Highway Engineering.****Associate Professor HYDE.**

Principles underlying the provision of facilities for transit and transportation in rural and urban districts; also, certain features of the proper construction and maintenance of country roads and city streets and pavements.

1 hr., first half-year. W, 10. Elective, Senior year, in the College of Civil Engineering.

**7A. Framed Structures.****Mr. TIBBETTS.**

The computation of stresses in roofs, building frames, and simple bridge trusses, by analytical and by graphical methods; discussion of the different methods of loading bridges, and the more important details of construction. Fully illustrated by practical problems and designs.

2 hrs., second half-year. M F, 10. Open to students who have taken, or who are taking, Course 8A, Physics 5, and Drawing 5. Prescribed, Junior year, in the College of Civil Engineering.

**7C. Framed Structures.****Associate Professor DERLETH and Mr. TIBBETTS.**

Continuation of Course 7A. Theory for and the making of complete detailed designs of several structures, such as a plate girder, roof and bridge trusses, etc. Bridge shop practice.

3 units each half-year. Tu Th, 10; W, 1-4, throughout the year. Prerequisite: Course 7A. Prescribed, Senior year, in the College of Civil Engineering.

**8A. Strength of Materials.**

Associate Professor DERLETH, and Mr. TIBBETTS.

Discussion of the elastic and ultimate resistance of the materials used in construction; of the best methods in designing parts of structures, such as bars, beams, girders, columns, and shafts. Both analytical and graphical methods are used in demonstration. Lectures, problems, and designs.

This course is given in two sections. Section I, 3 hrs., first half-year, Tu Th S, 9; and 2 hrs., second half-year, Tu Th, 9. Prescribed, Junior year, in the Colleges of Mechanics, Mining, and Chemistry.

Section II, 2 hrs., first half-year, Tu Th, 9; and 3 hrs., second half-year, M W F, 9. Prescribed, Junior year, in the College of Civil Engineering and in the Course in Architecture. Prerequisite: Mathematics 3B or 9B; and, for the second half-year, satisfactory standing in Physics 5.

**8B. Civil Engineering Laboratory.**

Mr. HUNT.

Supplementary to Course 8A. Machine tests of limes, cements, mortars, concretes, building-stones, etc.

3 hrs., second half-year; 1 unit. Section I, Tu, 1-4; II, Th, 1-4. Prerequisite: Course 8D. Prescribed, Junior year, in the College of Civil Engineering. The fee in this course is five dollars.

**8C. Laboratory Course in Strength of Materials.**

Mr. HUNT.

Supplementary to Course 8A. Laboratory machine tests of timber, metals, etc.

6 hrs., first half-year; 2 units. Laboratory, Tu Th, 1-4. Prerequisite: Course 8A. For Seniors and graduates. Prescribed, Senior year, in the Railroad and Sanitary Courses (1 unit), College of Civil Engineering. The fee in this course is ten dollars.

**8D. The Materials of Engineering Construction.**

Mr. HUNT.

Timber, stone, cements, concretes, pig iron, wrought iron, cast iron, steel, copper, etc.; their characteristics, properties, qualities necessary in construction, etc.

3 hrs., second half-year. Tu Th S, 9. Prescribed, Sophomore year, in the College of Civil Engineering.

**9. Drainage and Sewerage Engineering: Sewage and Refuse Disposal.** Associate Professor HYDE.

Sanitary drainage of rural and urban districts, and houses; the proper design and construction of sewerage works. Lectures, recitations, and problems.

Study of the character of sewage; of the principles underlying its treatment and purification; of the collection and disposal of garbage and other municipal wastes; and of the street cleaning problem.

3 hrs., first half-year. Tu W Th, 11. Prescribed, Senior year, in the Sanitary Course, College of Civil Engineering. Prerequisite: Course 11.

**10. Hydraulics.** Associate Professor HYDE.

The theory of hydraulics and application of principles to various problems. Studies of the flow of water through orifices, nozzles, and pipes, over weirs and in open channels; water meters, stream gaging, water hammer.

2 hrs., first half-year. Tu Th, 8. Prerequisite: Mathematics 3B; Physics 5 to be taken simultaneously. Prescribed, Junior year, in the College of Civil Engineering.

**11. Water Supply Engineering: Potability of Water, Water Purification, and Sanitation.** Associate Professor HYDE.

The underlying principles and the design of works for the collection, storage, and distribution of water for public and domestic use. Lectures, recitations, and problems.

A discussion of the quality of water from the æsthetic, commercial and sanitary points of view; a study of the methods of conserving the purity of water supplies and of water purification.

3 hrs., second half-year. Tu W Th, 11. Prescribed, Junior year, in the Sanitary Course, College of Civil Engineering. Prerequisite: Hygiene 3.

**12A. Dams of Timber, Stone, or Earth.**

Associate Professor HYDE.

3 hrs., first half-year. M W F, 8. Prescribed, Senior year, in the Sanitary and Irrigation Courses, College of Civil Engineering.

**\*12B. Stone Arches and Bridges and Retaining Walls.**

Professor SOULÉ.

Theory of the stone arch and of retaining walls; the designing and construction of bridges of stone and of retaining walls. Treated both analytically and graphically.

2 hrs., second half-year; 2 units. M F, 10. For Seniors and graduates in the College of Civil Engineering. Open to students who have completed Course 8A, and who are taking or have completed Course 13.

**13. Foundations of Structures.** Associate Professor DERLETH.

Ordinary foundations. A graduate course will be offered to supplement this.

2 hrs., second half-year; 2 units. Tu Th, 11. Prerequisite: Course 8A. Prescribed, Senior year, in the College of Civil Engineering.

**26. Sanitary Science, Municipal and State Sanitation.**

Associate Professor HYDE.

Outline of the most recent developments of knowledge concerning the relation of sanitary science to the public health; the sanitary aspect of water, milk, ice, and food supplies; discussion of certain other important municipal and state problems; disinfection; health laws, and organization of Boards of Health.

2 hrs., second half-year. Tu Th, 9. Prescribed, Senior year, in the Sanitary Course, College of Civil Engineering. Prerequisite: Courses 9A and 9B, 11A and 11B.

**19. Thesis for B.S. Degree in Civil Engineering.**

The candidate must register for this work during both half-years of his last or Senior year. The subject of the thesis will be chosen by the candidate, with the approval of the Dean of the College of Civil Engineering and the instructor or adviser who would have immediate direction of the work proposed. The thesis subjects of students expecting to be graduated in May must be selected and approved on or before the third Monday of the preceding September. The corresponding date for December graduates is the third Monday of the preceding February.

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\* Not to be given in 1907-08.

- A circular of detailed instructions governing thesis work is distributed to all interested students at the office of the Dean of the College of Civil Engineering, 9 Civil Engineering Building. Seniors must apply to the Dean for a copy of this circular at the time of their first registration for thesis work.

## GRADUATE COURSES.

**14. Framed Structures.**

Associate Professor DERLETH.

Continuation of Course 7c, including such subjects as continuous beams and girders, and swing, suspension, cantilever, and metallic arch bridges. More advanced work in designing and detailing framed structures.

3 units each half-year. First half-year, M W F, 10; second half-year, Tu Th, 9; W, 1-4. Prerequisite: Course 7c. Graduate students may devote additional time to this course upon approval of the Dean of the College of Civil Engineering.

**15. Laboratory Experiments.**

Mr. HUNT.

Experiments upon, and investigation concerning, the materials used in engineering construction. Practical tests of the "theories of flexure." Tests of full sized columns, girders, etc.

2 hrs., first half-year; 1 unit. Prerequisite: Courses 8A, 8B, 8C, and 8D.

**\*16. Specifications and Contracts.**

Professor SOULÉ.

Laws and forms of specifications and contracts in engineering operations. Lectures.

2 hrs., first half-year; 2 units. Prerequisite: Graduation from the College of Civil Engineering.

**\*17. Estimates of Cost of Construction.**

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A brief outline of price and method of forecasting the cost of proposed construction, including a determination of quantities, fixing of unit prices, and keeping record of cost data.

2 hrs., first half-year. Prerequisite: Senior or graduate standing in the College of Civil Engineering.

**\*18. Electric Railway Construction and Operation.**

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Lectures and seminary work.

2 hrs., second half-year.

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\* Not to be given, 1907-08.

**20. Reinforced Concrete Structures.**

Associate Professor DERLETH.

Throughout the year. Programme of work to be arranged in each case. Prerequisite: Course 7C.

**21. Theory of Elastic Work and Deflections.**

Associate Professor DERLETH.

Applications to statically indeterminate structures.

Throughout the year. Programme of work to be arranged in each case. Prerequisite: Course 7C.

**22. Sanitary Design.**

Associate Professor HYDE.

Practical illustrations of the features of the designs of systems, or portions of systems of works for water supply, water purification, sewerage, sewage and garbage disposal, etc. Typical problems and designs. Throughout the year.

Individual assignments. Prerequisite: Courses 9A, 9B, 11A, 11B, and 23.

**23. Sanitary Engineering Laboratory.** Associate Professor HYDE.

Tests and studies of certain sanitary apparatus, either experimental or in practical use in available localities.

Individual assignments. Prerequisite: 9A and 9B; 11A and 11B; 23 may be concurrent with and supplementary to 22.

**24. Steam Railway Construction.**

Lectures and seminary work.

2 hrs., second half-year.

**\*25. Deep and Difficult Foundations.**

Professor SOULÉ.

Pneumatic caissons, deep crib work, etc.

2 hrs., second half-year. For Seniors and graduates in Civil Engineering.

For advanced work in Civil Engineering the laboratory has recently been furnished with a large selection of apparatus specially provided to make tests and original experiments upon the materials used in engineering construction.

Every facility will be offered to students of engineering desiring to do advanced work in making use of this apparatus to prosecute, under the direction of the department, any duly approved original and independent investigations.

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\* Not to be given, 1907-08.



COURSES IN OTHER DEPARTMENTS.

**Physics and Analytic Mechanics.** [See Physics 5.]

Professor SLATE, Assistant Professors RAYMOND and HALL.

**Astronomy.** [See Astronomy 4B.] Assistant Professor CRAWFORD.

**Hydrodynamics.** [See Mechanics 2.]

Assistant Professor LECONTÉ.

**Irrigation.** [See Irrigation 1, 2, 2A, and 3.]

Professor MEAD and Assistant Professor ETCHEVERRY.

**Drawing and Graphostatics.** [See Drawing 5.]

Assistant Professor KOWER and Mr. WYTHER.

**Hygiene (Bacteriology).** [See Hygiene 2, 3, and 4.]

Assistant Professor WARD.

**IRRIGATION.**

ELWOOD MEAD, D.Eng., Professor of the Institutions and Practice of Irrigation.

BERNARD A. ETCHEVERRY, B.S., Assistant Professor of Irrigation.

Courses 1, 2, 2A, 3, and 4 are designed to meet the needs of engineering students who wish to make a specialty of irrigation. They appear as part of the course of Irrigation Engineering in the College of Civil Engineering. Courses 1, 3, 4, 5, and 5A are designed for students in the College of Agriculture. Course 1 is open to students in Economics.

**UPPER DIVISION COURSES.****1. Irrigation Institutions and Economics. Professor MEAD.**

Present conditions of irrigation in the United States; irrigation legislation; methods of establishing rights to water; interstate problems; conditions necessary to development of the agricultural resources of the arid West; comparisons of irrigation methods and laws of other lands with those of the United States; irrigation in humid sections of the United States; operation of irrigation works, individual, coöperative and corporate enterprises; national irrigation; water right contracts; duty of water. Lectures and recitations.

3 hrs., second half-year. M W F, 8. Prescribed, Senior year, in the Irrigation Course, College of Civil Engineering.

**2. The Diversion, Conveyance, and Application of Water.**

Assistant Professor ETCHEVERRY.

Units of measurement; flow of water through orifices, over weirs, and in open and closed channels; gauging laterals, canals, and streams by means of floats, current meters, weirs, modules; measurement of underground flow; irrigation works classified; diversion weirs and headgates; alignment, slope, and cross-section of canals; suitable grades for required velocities; construction and maintenance of canals; flumes and pipes for irrigation, their construction and use; pumping in irrigation. Full illustrations by lectures and practical problems.

3 hrs., second half-year. Tu Th S, 8. Prerequisite: Civil Engineering 10 or Mechanical Engineering 2.

**2A. Irrigation Design.**

Assistant Professor ETCHEVERRY.

The design of irrigation structures, such as headgates, flumes, and drops. Preparation of detailed estimates of cost of such structures.

3 hrs., throughout the year; 1 unit. Prescribed, Senior year, in the Irrigation Course, College of Civil Engineering. Prerequisite: Irrigation 2.

**3. The Conservation of the Water Supplies.**

Assistant Professor ETCHEVERRY.

Sources of water supply; precipitation, run-off and fluctuation in stream flow; loss of water by evaporation and seepage; return waters; storage of water in natural lakes and artificial reservoirs; utilization of subterranean sources of supply; conservation of soil moisture; influence of forests on water supply; methods of applying water to land; duty of water.

2 hrs., first half-year. Tu Th, 11. Prescribed, Junior year, in the Irrigation Course, College of Civil Engineering. Open to students in the College of Agriculture.

**4. Drainage.**

Assistant Professor ETCHEVERRY.

Structure of soils and its relation to drainage; necessity for drainage; its effects on the soil; ground water and its flow; laying out drains, distance between, depth and grade of drains; size of tile, kind of drains; drainage systems and districts; estimates of cost.

2 hrs., first half-year. Tu Th, 9. Prescribed, Senior year, in the Irrigation Course, College of Civil Engineering. Prerequisite: Irrigation 2 or Irrigation 5.

**5. Agricultural Hydraulics.**

Assistant Professor ETCHEVERRY.

Agricultural hydraulics and irrigation practice; laying out laterals, grading of land; design and construction of structures and mechanical appliances used by farmers in irrigation.

3 hrs., second half-year. M W F, 9-10.

Open to students in the College of Agriculture.

**5A. Irrigation Drawing.**

Assistant Professor ETCHEVERRY.

Drawing and making estimates of typical irrigation structures as used on the farm.

3 hrs., throughout the year; 1 unit. Prerequisite: Irrigation 5.

**MINING AND METALLURGY.**

SAMUEL B. CHRISTY, Ph.B., Sc.D., Professor of Mining and Metallurgy.

ERNEST A. HERSAM, B.S., Associate Professor of Metallurgy.

CURTIS H. LINDLEY, Honorary Professor of the Law of Mines and Water.

WALTER S. MORLEY, B.S., Assistant Professor of Metallurgy.

L. H. DYKE, B.S., Assistant in Mining.

GEORGE SPENCER, Mechanician.

EDWIN P. WILLOUGHBY, Helper in Mining Laboratory.

ALFRED W. BURBANK, Storekeeper and Laboratory Helper.

FRANK H. GLASSON, B.L., Clerk.

The lecture courses described below are fully illustrated by lantern-slides, showing methods used in all the principal mining fields. The laboratory courses are designed to illustrate and supplement the lecture courses.

Laboratory deposits are twenty-five dollars a half-year for laboratory courses 7A, 7B, 9, 10, and 13. The amount returned to the student at the end of the half-year, after deducting for cost of materials actually used and for breakage of apparatus, is usually five or ten dollars.

Students who take any of the following courses, as a rule, must have at least Junior standing in the College of Mining.

**1. Lectures on Mining.**

Professor CHRISTY.

Ores: their nature, occurrence, and relation to mining laws.

Location of claims, methods of prospecting, excavating, tunneling, shaft-sinking, and timbering.

4 hrs., first half-year. M Tu Th F, 9. Prerequisite: Senior standing in the College of Mining. Prescribed, Senior year, to students in the College of Mining.

**2. Lectures on Mining.**

Professor CHRISTY.

Winning, exploration, and exploitation. Methods of transportation and hoisting; of drainage, ventilation, and lighting; of general organization and administration.

4 hrs., second half-year. M Tu Th F, 10. Prerequisite: Course 1. Prescribed, Senior year, to students in the College of Mining.

**3. Mining Laboratory.**

Professor CHRISTY, Assistant Professor MORLEY,  
and Mr. WILLOUGHBY.

Lectures on explosives and blasting; with laboratory practice in sharpening, hardening, and tempering hand and machine drills; the use of single and double hand drills, and of machine drills; explosives and the theory and practice of placing, charging, and firing of blasts.

3 hrs. laboratory and 2 hrs. lecture, second half-year; 3 units.  
2 hrs. lecture, Tu Th, 10; laboratory, W, 1-4, and S, 9-12.  
Prescribed, Junior year, to students in the College of Mining.

**4. Summer Class in Practical Mining. (Senior Conference.)**

Professor CHRISTY.

During the vacation at the end of the Junior year, all mining students will be required to spend at least four weeks in the systematic study of practical mining, taking notes and making sketches of processes observed. This is the minimum requirement. It is recommended that all free vacation time throughout the four years be devoted to this study, and that a large part of this time be given to actual work underground at the various branches of practical mining. Details in every case must be arranged in consultation with Professor Christy. A full report on this work must be presented and read before the Seniors at the mining conferences during the Senior year. This conference will be held weekly.

W, 9, first half year; W, 10, second half-year.

**5. Metallurgy: Structural Metals and Fuels. Professor CHRISTY.**

The classification of ores: methods and appliances for their reduction, and their bearing on the physical properties of the structural metals. Fuels, and their relative value as heat-producers.

2 hrs., first half-year. M F, 10. Prerequisite: Chemistry 1 and 3; Physics 1, 2A, and 3. Prescribed, Junior year, in the College of Mining.

**6. Metallurgy: Ore Crushing, Sampling, Fluxes.**

Associate Professor HERSAM.

Methods of crushing ores; of sampling ores and their products; fluxes, refractory materials, and metallurgical products.

2 hrs., second half-year. M W, 8. Prerequisite: Mining 5, Chemistry 1 to 6, Physics 1 to 3, and Mineralogy 1. Prescribed, Junior year, in the College of Mining. Required of students who elect Courses 7A, 7B, 8, 9, 10, 11, and 13.

**7A. Assaying.**

Assistant Professor MORLEY.

Lectures and laboratory practice. The proper use and care of the assay balance. Cupellation of gold and silver. Parting of gold and silver. Preparation of the sample. Scorification assays of gold and silver ores. Crucible method for these ores.

6 hrs., first half-year; 2 units. Section I, M Tu, 1-4; II, W Th, 1-4; III, F, 1-4, and S, 9-12. Conference for all sections, W, 10. Prerequisite: Chemistry 1 to 6, inclusive; Mineralogy 1; Mining 5 and 6. Prescribed, Junior year, in the College of Mining.

**7B. Assaying.**

Assistant Professor MORLEY.

Lectures and laboratory practice. Fire assays of ores of lead, antimony, tin, nickel, cobalt, copper, iron.

6 hrs., second half-year; 2 units. Section I, M Tu, 1-4; II, Th F, 1-4. Conference for both sections (when necessary), W, 9. Prerequisite: Course 7A. Prescribed, Junior year, in the College of Mining.

**8. Metallurgy of Gold, Silver, and Quicksilver.**

Professor CHRISTY.

Lectures on the amalgamation of gold and silver; processes for leaching silver ores; chlorination and cyanide processes with gold ores; quicksilver reduction and condensation.

2 hrs., first half-year. Tu Th, 10. Prerequisite: Courses 5, 6, 7. Prescribed, Senior year, in the College of Mining.

**9. Metallurgical Laboratory: Mill Work.**

Supplementary to Course 8. Associate Professor HERSAM.

Experiments on a working scale in crushing, sampling, concentrating, roasting, leaching, and amalgamating gold and silver ores.

6 hrs., first half-year; 2 units. Section I, M Tu, 1-4; II, Th F, 1-4. Prescribed, Senior year, in the College of Mining. Prerequisite: Courses 5, 6, 7A, and 7B. Students who enroll for this course must also enroll for Course 8.

**10. Metallurgical Laboratory: Mill Work.**

Professor CHRISTY and Associate Professor HERSAM.

Supplementary to Course 8.

The investigation of special problems in the treatment of ores, particularly of the precious metals. An introduction to research work. Such Seniors only as take this course will be allowed to elect a thesis in metallurgy.

6 hrs., second half-year; 2 units. Section I, M Tu, 1-4; II, Th F, 1-4. Prerequisite: Courses 5, 6, 7, 8, and 9. Elective, Senior year (with Drawing 7), in the College of Mining.

**11. Metallurgy of Lead and Copper.**

Associate Professor HERSAM.

Methods of smelting lead and copper ores, with particular reference to their gold and silver content.

2 hrs., second half-year. M F, 8. Prerequisite: Courses 5, 6, 7, 8. Prescribed, Senior year, in the College of Mining.

**17. Thesis for B.S. Degree in Mining.**

The subject of the undergraduate thesis may be either: (A) a detailed study of some mining or metallurgical problem, such as the method of opening up or working a given mine; or some method of hoisting or transporting ore; or some problem in mine drainage, lighting or ventilation; or the best method of concentrating or working some ore; or the design of a mill, concentrating plant, or reduction works; or (B) a detailed study of some chemical, mineralogical, geological, or of some physical or economic question bearing upon the problems of mining or metallurgy.

The main purpose of the thesis requirement is to serve as an introduction to the creative work of the engineer, and to train the student in methods of independent thinking and original research either by experimental work in the laboratory, by observation in the field, or by collating and discussing the work of others. In selecting a subject for a thesis the student is advised to avoid subjects of a vague and indefinite nature, or such as are too extensive for the time allowed him, but in each case to select some definite problem or concrete question such as those which have arisen in connection with his summer school work, so that he may be able in the time and with the means at his command to master thoroughly the questions he has undertaken to solve, and to make a small but positive addition to the knowledge of the subject, rather than to write a general, discursive essay.

The exact subject of this thesis must be submitted to the Professor of Mining and Metallurgy by the first of September of each year and must be approved by him. A report of the progress must be filed with him on the first of December of that year, and the copy of the completed paper must be filed with him not later than the first of May of each year. All such papers must be typewritten on good paper,  $8\frac{1}{2} \times 11$  inches. All drawings must be in the form of blue-prints or tracings, and all illustrations must be either cut or folded to maximum dimensions of  $8\frac{1}{2} \times 11$  inches. The whole must be securely bound so as to preserve the text of the thesis and its illustrations.

## GRADUATE COURSES.

The above courses, given as undergraduate courses, are open to graduate students whose previous preparation in science and engineering has fitted them to undertake the work.

The above courses provide fourteen units of work per week during the first half-year, and twelve units per week during the second half-year, and include both lecture and laboratory work.

The attention of those who wish to prepare themselves for the mining and metallurgy of the precious metals is directed to these courses as well as to the following courses intended primarily for graduates. The libraries, laboratories, and museums of the University have been carefully designed to meet the needs of such students, and it is confidently believed that opportunities are offered for the study of the mining and metallurgy of the precious metals which are not met with elsewhere.

**12. Ore Dressing.**

Professor CHRISTY.

Theory of ore separation: discussion of the leading methods in use for separating coarsely and finely disseminated minerals, with particular reference to the treatment of gold and silver ores, and also those of copper, lead, zinc, iron, and tin.

Primarily for graduates. 2 hrs., second half-year. Tu Th, 10.

Open also to properly qualified Seniors in the College of Mining.

**13. Special Investigations in Treatment of Gold and Silver Ores.**

Professor CHRISTY.

Prerequisite: Courses 5, 6, 7A, 7B, 8, 9, 10, 11, 12.

**14. Mining Law of the United States.**

Professor LINDLEY.

Open to Seniors in the College of Mining.

A course of twelve lectures given first half-year.

**15. Engineering Law.**

Professor LINDLEY.

Lectures adapted to the needs of mining students.

Second half-year. Details to be announced later.

**16. Metallurgy of Iron and Steel.** Associate Professor HERSAM.

The ores of iron and the methods for their reduction. The production of pig iron, wrought iron, and the various grades of steel. The physical properties of structural iron and steel as related to chemical composition and metallurgical treatment.

Primarily for graduates. Prerequisite: At least Senior standing in the College of Mining. 2 units. First half-year. Hours to be arranged later.



# **DRAWING.**

**HERMANN KOWER, C.E.,** Assistant Professor of Drawing.

**HERMAN W. REYNOLDS, B.S.,** Assistant Professor of Mechanical Engineering.

**C. CHAPEL JUDSON,** Instructor in Free-hand Drawing.

**WILLSON J. WYTHE, B.S.,** Instructor in Drawing.

**HENRY B. MONGES, Jr.,** Instructor in Drawing.

## **LOWER DIVISION COURSES.**

### **A. Elementary Free-hand Drawing.**

**Mr. JUDSON.**

Drawing in pencil from models, embracing the study of light and shade and perspective; with lectures.

3 hrs., throughout the year; 1 unit each half-year. Section I, W, 1-4; II, Tu, 1-4; III, Tu, 9-12; IV, F, 1-4. This course is equivalent to matriculation subject 16.

### **B. Instrumental Drawing.**

**Mr. WYTHE and Mr. MONGES.**

Instrumental drawing, solving of geometrical problems, construction of mathematical curves, lettering.

3 hrs., throughout the year; 1 unit each half. Sections I and II, Tu Th, 1-4; III, M F, 1-4; IV, W, 1-4, and S, 9-12; V, VI, Tu Th, 9-12. This course is equivalent to matriculation subject 17.

### **2A. Descriptive Geometry.**

**Assistant Professor KOWER, Mr. WYTHE, and Mr. MONGES.**

Fundamental problems on point, line, plane; sections; intersections.

6 hrs., first half-year; 2 units. Section I, Tu Th, 1-4; II, M F, 1-4; III, W, 1-4, and S, 9-12; IV, Tu Th, 9-12. Prescribed, Sophomore year, in the colleges of engineering. Prerequisite: Course 1 or matriculation subject 17.

### **2B. Descriptive Geometry.**

**Assistant Professor KOWER and Mr. WYTHE.**

Shades and shadows, perspective, isometric projection.

6 hrs., second half-year; 2 units. Section I, Tu Th, 9-12; II, Tu Th, 1-4; III, Tu Th, 1-4. Prescribed, Sophomore year, in the colleges of engineering. Prerequisite: Course 2A.

**3. Mechanical Drawing.**

Mr. —.

Elementary machine design. Work at the drawing board, supplemented by lectures upon the principles underlying the design of elements of machines.

6 hrs., second half-year; 3 units. Tu Th, 1-4. Prescribed, Sophomore year, in the College of Mechanics. Prerequisite: Course 2A.

**9. Free-hand Lettering and Round Writing.**

Mr. WYTHE and Mr. MONGES.

3 hrs., second half-year; 1 unit. Open to students in Drawing.

## UPPER DIVISION COURSES.

**4. Machine Design.**

Assistant Professor REYNOLDS.

Continuation of Course 3. Design of spur and bevel gearing and typical machines suitable for illustrating the general principles of engineering design.

6 hrs., first half-year; 2 units. M F, 1-4. Prerequisite: Course 3. Prescribed, Junior year, in the College of Mechanics.

**5. Graphostatics.** Assistant Professor KOWER and Mr. WYTHE.

Graphical analysis of stresses in engineering structures.

2 hrs., second half-year. Section I, M, 2-4; II, W, 2-4; III, F, 2-4. Prescribed, Junior year, in the colleges of engineering.

**7. Construction.**

Assistant Professor KOWER.

This course is a continuation of Course 5, and includes the designing of engineering structures, such as roof-trusses, bridges, etc.

6 hrs., throughout the year; 2 units each half-year. M F, 1-4. Prescribed, Senior year, in the Mechanical Course, College of Mechanics.

**10. Stereotomy.**

Assistant Professor KOWER.

Continuation of Course 2B, intended for students of Architecture.

6 hrs., first half-year; 2 units.

**14. Advanced Work in Free-hand Drawing.**

Mr. JUDSON.

6 hrs., throughout the year. W F, 9-12.

# **ARCHITECTURE.**

JOHN GALEN HOWARD, Professor of Architecture.

M. EARL CUMMINGS, Instructor in Modeling.

HARRY W. SEAWELL, Instructor in Water Coloring and Pen and Ink Drawing.

WILLIAM CHARLES HAYS, Assistant in Architecture.

## †\*5A. **History of Ancient and Classic Architecture.**

Professor HOWARD.

A general survey of the history of ancient and classic Architecture, with an analytical study of its character, illustrated by lantern slides. Open to all students in the University as a free elective.

1 hr., throughout the year; 1 unit each half-year.

## †\*5B. **History of Mediaeval and Renaissance Architecture.**

Professor HOWARD.

A study of the architecture of the Middle Ages and the Renaissance period, illustrated by lantern slides. Open to all students in the University as a free elective.

1 hr., throughout the year; 1 unit each half-year.

## 5C. **History of Modern Architecture.**

Professor HOWARD.

A detailed study of modern architecture, illustrated with lantern slides. Open to all students in the University as a free elective.

1 hr., first half-year; 1 unit.

## 5D. **History of Allied Arts.**

Professor HOWARD.

1 hr., second half-year; 1 unit.

NOTE.—Students taking Architectural Design (Courses 1, 2, 3, or 4) will devote three additional hours per week (1 unit each half-year) to historical drawing corresponding with the course of lectures.

\* The full course in History of Architecture and Allied Arts (5A, 5B, 5C, and 5D) is covered in three years, the courses being given in succession, one each year.

† Courses 5A and 5B will not be given in 1907-08; in their place students will take Courses 5C and 5D.

## UPPER DIVISION COURSES.

1. **Elements of Architecture.** Mr. HAYS.  
Drawing of the Classic Orders and their application.  
12 hrs., throughout the year; 4 units each half-year. Prerequisite: Drawing 2A and 2B.
2. **Planning.** Professor HOWARD.  
Fundamental problems in planning.  
18 hrs., first half-year, 6 units; 21 hrs., second half-year, 7 units.  
Prerequisite: Course 1.
- 6A. **Theory of Architecture.** Mr. HAYS.  
A seminar course, prescribed to students in Architecture 1.  
1 hr., throughout the year; 1 unit each half-year.
- 6B. **Theory of Architecture.** (Continuation of Course 6A.) Professor HOWARD.  
A seminar course, prescribed to students in Architecture 2.  
1 hr., throughout the year; 1 unit each half-year.
12. **Water Color.** Mr. SEAWELL.  
Architectural rendering in water color.  
1 hr., throughout the year; 1 unit each half-year. Prerequisite: Drawing 14.
13. **Pen and Ink.** Mr. SEAWELL.  
Architectural subjects rendered in pen and ink.  
1 hr., throughout the year; 1 unit each half-year. Prerequisite: Drawing 14.
14. **Modeling.** Mr. CUMMINGS.  
Modeling of architectural ornament.  
1 hr., throughout the year; 1 unit each half-year. Prerequisite: Drawing 14.

## GRADUATE COURSES.

3. **Planning and Composition.** Professor HOWARD.  
Problems in planning and composition.  
27 hrs., first half-year, 9 units; 30 hrs., second half-year, 10 units.  
Prerequisite: Course 2.
4. **Advanced Design.** Professor HOWARD.  
Advanced problems in planning and composition.  
45 hrs., first half-year; 15 units. Prerequisite: Course 3.

**6c. Theory of Architecture.** (Continuation of Course 6B.)

Professor HOWARD.

Seminar course, prescribed to students in Architecture 3.

1 hr., throughout the year; 1 unit each half-year.

**7. Steel Construction and Fireproofing.**

2 hrs., first half-year; 2 units.

**8. Architectural Mechanics.**

Mechanical and electrical engineering in relation to Architecture.

2 hrs., first half-year; 2 units.

**9. Specifications and Working Drawings.**

3 hrs., first half-year; 3 units.

**10. Business Relations.**

2 hrs., first half-year; 2 units.

**11. Sanitary Science.**

Plumbing, water supply, drainage, etc., from an architectural standpoint. (Students will take Civil Engineering 9 in place of this course until further notice.)

**15. Electrical Engineering as applied to Buildings.**

Power, light, etc.

2 hrs., second half-year; 2 units.

**16. Mechanical Engineering as applied to Buildings.**

Heating, ventilation, elevators, etc.

2 hrs., second half-year; 2 units.

COURSES IN OTHER DEPARTMENTS.

**Strength of Materials.** [See Civil Engineering 8A.]

Associate Professor DERLETH and Mr. TIBBETTS.

**The Materials of Engineering Construction.** [See Civil Engineering 8D.]

Mr. HUNT.

**Framed Structures.** [See Civil Engineering 7A.]

Associate Professor DERLETH and Mr. TIBBETTS.

**Analytic Mechanics.** [See Physics 5.]

Professor SLATE, Assistant Professor RAYMOND, and Dr. GRAY.

**Graphostatics.** [See Drawing 5.]

Assistant Professor KOWER and Mr. WYTHER.

**Drainage and Sewerage Engineering.** [See Civil Engineering 9.]

Associate Professor HYDE.

**AGRICULTURE, HORTICULTURE, AND ENTOMOLOGY.**

- EUGENE W. HILGARD, Ph.D., LL.D., Professor of Agriculture, Emeritus.  
 EDWARD J. WICKSON, M.A., Professor of Agricultural Practice and  
 Dean of the College of Agriculture.  
 CHARLES W. WOODWORTH, M.S., Associate Professor of Entomology.  
 ROBERT H. LOUGHRIDGE, Ph.D., Associate Professor of Agricultural  
 Geology and Agricultural Chemistry.  
 MYER E. JAFFA, M.S., Associate Professor of Nutrition; in charge  
 of Laboratory of Agricultural Chemistry.  
 RALPH E. SMITH, B.S., Associate Professor of Plant Pathology and  
 Superintendent Southern California Pathological Laboratory  
 and Experiment Station.  
 GEORGE W. SHAW, M.A., Ph.D., Assistant Professor of Agricultural  
 Technology, in charge of Cereal Stations.  
 GEORGE E. COLBY, M.S., Assistant Professor of Agricultural Chemistry.  
 ERNEST W. MAJOR, B.Agr., Assistant Professor of Animal Industries  
 and Manager of University Farm.  
 FREDERIC T. BIOLETTI, M.S., Assistant Professor of Viticulture.  
 HENRY J. QUAYLE, A.B., Assistant Professor of Entomology.  
 WARREN T. CLARKE, B.S., Assistant Professor of Horticulture and  
 Superintendent of University Extension in Agriculture.  
 CLARENCE M. HARING, D.V.M., Instructor in Veterinary Science and  
 Bacteriology.  
 ROBERT E. MANSELL, Instructor in Horticulture, in charge of the agri-  
 cultural grounds.  
 E. B. BABCOCK, B.S., Instructor in Plant Pathology.  
 JOHN S. BURD, B.S., Instructor in Agricultural Chemistry.  
 HANS C. HOLM, B.S., Assistant in Zymological Technology.  
 ELIZABETH H. SMITH, M.S., Assistant in Plant Pathology.  
 RALPH BENTON, B.S., Assistant in Entomology.  
 MATTIE E. STOVER, Assistant in Agricultural Laboratory.  
 G. W. LYONS, Assistant in Soil Laboratory.  
 A. J. GAUMNITZ, B.S.A., Assistant in Cereal Laboratory.  
 J. D. ROSE, Assistant in Cereal Investigation.  
 P. L. MCCREARY, Assistant in Fertilizer Control.

The officers whose names follow are engaged primarily in short-  
 course and University Extension work.

- DOUGLAS T. FOWLER, M.A., Conductor of Farmers' Institutes north  
 of the Tehachapi.  
 J. B. NEFF, Conductor of Farmers' Institutes south of the Tehachapi.

The large number of entirely distinct subjects grouped under Agriculture has made it desirable to segregate these into sub-departments. The numbering of the courses has been made uniform in all, and conforms to the following scheme:

1. Lower division courses are indicated by the numerals 1-9, upper division and graduate courses by numbers of two digits.

2. Laboratory courses which require two to three hours with the instructor for each unit of credit are denominated by the odd numbers.

3. Courses numbered above twenty have definite prerequisites. Students should plan as early as possible for their advanced courses to allow time for these prerequisites.

Courses should be recorded by the title of the sub-department; *i.e.*, Horticulture 16 (*not* Agriculture 16).

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## **AGRICULTURE.**

The courses classed under this heading are of a general nature and may be grouped with any of the other sub-departments.

Course 12 may be taken by students in the colleges of general culture as part of the prescribed work in natural sciences in those colleges.

### **LOWER DIVISION COURSES.**

#### **2. Agricultural Literature.** Professor WICKSON and others.

An elementary course designed for the study of current agricultural literature, especially the publications of the agricultural experiment stations of the several states.

1 hr., either half-year. Tu, 10. May be repeated indefinitely without duplication of work. Open to students in the College of Agriculture. Regular students are advised to begin the course in the Freshman year.

#### **4. University Extension in Agriculture.**

Professor WICKSON and others.

Study and discussion of policies, methods, and practices of university extension in agricultural lines, as pursued by state universities and colleges of agriculture.

1 hr., either half-year. Th, 10. May be repeated indefinitely without duplication of work. Open to students in the College of Agriculture.

UPPER DIVISION COURSES.

**12. Chemistry of Plants.**      Assistant Professor LOUGHRIDGE.

Chemistry of plants and their products, with reference to their uses. Inorganic ingredients of plants; ash analysis. Physics and nutrition of plants.

3 hrs., first half-year. Tu Th S, 11.

**14. Agriculture.**      Professor WICKSON.

Field culture of grains, vegetables and forage plants.

3 hrs., first half-year. M W F, 9. Prescribed, Senior year, in the Irrigation Course, College of Civil Engineering.

**American Agriculture.** (See Economics 5A.)

Associate Professor PLEHN.

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**SOILS.**

The origin, structure, and management of soils, including the use of fertilizers and water, constitute the subject-matter of this sub-department.

UPPER DIVISION COURSES.

**Irrigation Institutions and Economics.** [See Irrigation 1.]

Professor MEAD.

**The Diversion, Conveyance, and Application of Water.** [See Irrigation 2.]

Assistant Professor ETCHEVERRY.

**The Conservation of the Water Supplies.** [See Irrigation 3.]

Assistant Professor ETCHEVERRY.

**Drainage.** [See Irrigation 4.]      Assistant Professor ETCHEVERRY.

**21. Analysis of Soils. Waters and Fertilizers.**

Assistant Professors JAFFA and COLBY.

Desk room is provided for twenty-five advanced and special students, for instruction in the analysis of soils, waters, and fertilizers.

12 or 15 hrs., throughout the year, or half-year (as the student may elect); 4 or 5 units, each half-year. M Tu W Th F, 1-4, and S, 9-12. Prerequisite: Chemistry 3 and 5A.



**22. Chemistry and Physics of Soils.**

Assistant Professor LOUGHRIDGE.

Origin, formation, and classification of soils. Physical properties and mechanical analysis; chemical composition. Soil analysis—its methods, utility, and interpretation. Policy of culture; exhaustion of soils and their fertilization and restoration; drainage, irrigation; soils of the arid and humid regions; soil regions of the Pacific coast.

3 hrs., second half-year. Tu Th S, 11. Prerequisite: Botany 1 and 2; Chemistry 1, 2, 3, and 4.

**23. The Physics and Geology of Soils.**

Assistant Professor LOUGHRIDGE.

2 hrs. lecture, 2 units; or, with 3 hrs. laboratory work, 3 units, first half-year. W F, 10. Prescribed, Sophomore year, in the Irrigation Course, College of Civil Engineering.

**24. The Chemistry of Fertilizers.**

Mr. BURD.

The relations of fertilizers to plants and soils. Their occurrence, manufacture, composition, examination, and governmental control.

1 hr. lecture, second half-year. M, 10.

GRADUATE COURSES.

**31. Laboratory Research in Agricultural Chemistry.**

Assistant Professors JAFFA and COLBY.

**32. Soil Areas and Soil Distribution in California.**

Assistant Professor LOUGHRIDGE.

Lectures, with photographs and lantern-slide illustrations of topographical features of the State.

1 hr., second half-year. W, 11. Prerequisite: Soils 22.

**34. Soils and Climate.**

Professor HILGARD.

Lectures with illustrations.

1 hr., first half-year. M, 11.

## **HORTICULTURE.**

### **LOWER DIVISION COURSES.**

1. **Plant Propagation.** Mr. MANSELL.  
A study of the methods of securing and perpetuating desirable varieties of plants,—grafting, budding, layering, making cuttings, pollination, seedage, etc. Lectures, text-book, and practical exercises.  
1 hr. lecture, 2 hrs. practical exercises, second half-year. S, 9-12.
2. **Landscape Gardening.** Mr. MANSELL.  
The principles of ornamental and landscape gardening, with special reference to the beautifying of home grounds. Lectures, illustrated by means of lantern slides and charts.  
1 hr., first half-year. M, 10.

### **UPPER DIVISION COURSES.**

12. **Horticulture.** Professor WICKSON.  
Principles and practice of fruit growing in semi-tropical countries, with special reference to California conditions and methods.  
3 hrs., second half-year. M W F, 9. Optional with Mechanical Engineering 3, Senior year, in the Irrigation Course, College of Civil Engineering.
  14. **Chemistry of Fruits.** Assistant Professor COLBY.  
Chemical composition of fruits, and its relations to orchard soils, fertilizers, irrigation water, etc.  
1 hr. lecture, second half-year. W, 1.
  16. **Viticulture.** Assistant Professor BIOLETTI.  
A general course in the methods of establishing and maintaining a vineyard, with special reference to conditions existing in California.  
2 hrs. lectures, 2 units, second half-year. Tu Th, 8.
  17. **Ampelography and Viticultural Laboratory.**  
Assistant Professor BIOLETTI and Mr. —.  
Study of the gross and minute structure of the vine; microscopical study of vine diseases.  
1 hr. lecture and 3 hrs. laboratory, 2 units, second half-year.
- Economic Botany.** [See Botany 14.] Dr. H. M. HALL.

GRADUATE COURSES.

31. **Advanced Instruction in Horticulture.** Professor WICKSON.

33. **Advanced Instruction in Viticulture.**

Assistant Professor BIOLETTI.

Study of special problems. Prerequisite: Horticulture 16 and 17.

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**ENTOMOLOGY.**

The relations of insects to human interests, particularly their effects on agriculture, are the primary subjects dealt with in this department. The courses are planned, therefore, to give preparation for the teaching of nature study, and for the practical control of insects by the farmer or professional entomologist.

Courses 1, 2, and 4 may be taken by students in the colleges of general culture as prescribed work in natural sciences in those colleges.

Courses 1, 2, 4, 14, 16, 21, 23, 25, 30, and 31 are especially suitable as preparation for nature study work.

Courses 11, 12, 13, 14, 16, 26, and 28 are available along strictly agricultural lines.

Courses 23, 27, 30, 33, and 35 prepare for research in biology.

Courses 1, 2, 21, 22, 23, 30, and 35 prepare for work in systematic entomology.

Those intending to become professional entomologists should elect as nearly as possible all the courses offered. The graduate courses presuppose a reading knowledge of both French and German, as well as preparation in the natural sciences, chemistry, physics, zoology, physiology, and botany. The student cannot take too much of the latter subjects.

There are no laboratory deposits required in this department, but students are expected to provide a part of their own equipment. The cost of this material need not exceed five dollars in any course, usually is much less. Those who desire, however, to purchase a compound microscope for their individual use are advised to do so.

### LOWER DIVISION COURSES.

1. **Laboratory Methods.**     Associate Professor WOODWORTH,  
Assistant Professor QUAYLE, and Mr. BENTON.  
A series of practical exercises, designed to acquaint the student with the commoner methods of studying insects; including the methods of collecting, mounting, and breeding insects; the use of the microscope, the microtome, and the simpler physiological apparatus; the camera lucida and lantern enlargements, and other micrographic methods.  
3-9 hrs., 1 to 3 units, either half-year. Section I, M F, 1-4 (Assistant Professor QUAYLE); Section II, Tu Th, 1-4 (Associate Professor WOODWORTH and Mr. BENTON); Section III, W, 1-4 (Mr. BENTON).
  2. **General Entomology.**  
Associate Professor WOODWORTH and Assistant Professor QUAYLE.  
A general review of the structure, habits, and classification of insects.  
2 hrs., first half-year. Section I (Associate Professor WOODWORTH), Tu Th, 9; Section II (Assistant Professor QUAYLE), Tu Th, 10.
  4. **Ecology.**  
Associate Professor WOODWORTH and Assistant Professor QUAYLE.  
A discussion of the relation of insects to their environment.  
2 hrs., second half-year. Section I (Associate Professor WOODWORTH), Tu Th, 9; Section II (Assistant Professor QUAYLE), Tu Th, 10.
- NOTE.—A second section of Courses 2 and 4 may be given Tu and Th at 10 in case there is sufficient demand.

### UPPER DIVISION COURSES.

11. **Spraying.**     Assistant Professor QUAYLE.  
A study of the methods of spraying plants for the control of insect pests and fungous diseases. Lectures and practical exercises.  
2 hrs., 1 unit, second half-year. S, 10-12.
12. **Insecticides and Fungicides.**     Assistant Professor COLBY.  
The composition and compounding of remedies.  
1 hr., first half-year. Th. 2.

13. **Apiary Work.** Mr. BENTON.  
A series of practical exercises illustrating the modern methods of bee keeping.  
3 hrs., 1 unit, second half-year. S, 10-12.
14. **Apiculture.** Mr. BENTON.  
The structure and habits of bees, and their management for the production of honey.  
1 hr., both half-years. S, 9.
16. **Economic Entomology.** Associate Professor WOODWORTH.  
Detailed studies of a series of the most injurious insects.  
2 hrs., first half-year. M F, 10.
21. **Taxonomy.** Assistant Professor QUAYLE.  
A study of the classification of insects. The student makes a collection of insects of all orders, mounts, determines and labels the same.  
9 hrs., 3 units, first half-year. Tu Th, 1-4. Prerequisite: Entomology 1.
22. **Entomology of Linnaeus.** Associate Professor WOODWORTH.  
A study of the relation of the Linnaean groups to the modern classification of insects, illustrated by a very complete set of specimens of species known by Linnaeus and his immediate successors.  
2 hrs., first half-year. M F, 10. Prerequisite: Entomology 21.
23. **Entomography.** Associate Professor WOODWORTH.  
A thorough drill in the methods of making illustrations for publication and for teaching.  
9 hrs., 3 units, second half-year. M W F, 1-4. Prerequisite: Entomology 1.
24. **Mosquitoes.** Assistant Professor QUAYLE.  
A detailed study of the practical problems of mosquito control.  
2 hrs., second half-year. M F, 10. Prerequisite: Entomology 1.
25. **Metamorphoses.** Associate Professor WOODWORTH.  
Insectary work supplemented by a review of the literature on insect metamorphosis.  
6 hrs., 2 units, first half-year. M W F, 1-4. Prerequisite: Entomology 1.

196     *Agriculture, Horticulture, and Entomology.*

- \*26. Entomology of Riley.**     Associate Professor WOODWORTH.  
An historical review of the older school of economic entomologists, culminating in Riley and the most evident modern tendencies.  
2 hrs., first half-year. Tu Th, 11. Prerequisite: Entomology 16.
- 27. Morphology.**     Assistant Professor QUAYLE.  
The gross anatomy of insects, the use of microtomical methods of study and the construction of models.  
9 hrs., 2 units, second half-year. Tu Th, 1-4. Prerequisite: Entomology 1.
- \*28. Scale Insects.**     Associate Professor WOODWORTH.  
The structure, habits, and economics of scale insects.  
2 hrs., second half-year. Tu Th, 11. Prerequisite: Entomology 1.

GRADUATE COURSES.

- 30. Library Work.**     Associate Professor WOODWORTH.  
Assigned readings and written papers.  
1 unit, either half-year. Tu, 4.
- 32. Teachers' Conference.**     Associate Professor WOODWORTH.  
A seminary course for the study of topics relating to the teaching of entomology.  
1 hr., either half-year. Th, 4.
- 33. Special Problems.**  
Associate Professor WOODWORTH and Assistant Professor QUAYLE.  
Individual instruction in some special problem in entomology.  
2 or more units, either half-year. M Tu W Th F, 8-4; S, 8-12.
- 35. Research Work.**     Associate Professor WOODWORTH.  
Individual investigation under the direct supervision of the instructor, but not necessarily at Berkeley nor during the term.  
Credit will be given only on the basis of work ready for publication.

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\* Not to be given in 1907-08.

**PLANT PATHOLOGY.**

Students intending to take advanced or special work on plant diseases should lay a thorough foundation in the allied subjects, particularly in botany, and in chemistry, physics, bacteriology, entomology, agricultural practice, and modern languages. The growing demand for specialists in this line, both in California and elsewhere, may be expected to lead to increased facilities for instruction and specialization in the investigation of phyto-pathological problems. The natural opportunities afforded for such training in California may fairly be said to surpass those of almost any other region.

**LOWER DIVISION COURSE.**

- 2. General Plant Pathology.** Assistant Professor SMITH.  
Lectures, illustrated by specimens, charts, photographs, and field observations, on the general relation of economic plants to conditions which affect their health, vigor, and productiveness.  
2 hrs., second half-year. Tu Th, 9.

**UPPER DIVISION COURSES.**

- 21. Advanced Laboratory in Plant Pathology.**  
Assistant Professor SMITH.  
Experimental and laboratory study in plant diseases.  
2 or more units, either or both half-years. Hours to be arranged.  
Open to students properly qualified in botany and allied subjects, who have taken Plant Pathology 2.
- 22. Advanced Lectures in Plant Pathology.**  
Assistant Professor SMITH.  
Intended particularly for students electing Plant Pathology 21.  
2 hrs., either or both half-years. Time to be arranged.

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**AGRICULTURAL INDUSTRIES.**

**UPPER DIVISION COURSES.**

- 11. Sugar Technology.** Assistant Professor SHAW.  
A study of practical methods of field, factory, and laboratory management in the manufacture of beet sugar. The lectures aim to give the student a detailed description of the individual processes involved in the manufacture of sugar from both

a theoretical and practical standpoint, as well as an understanding of the sugar-house as a unit.

2 hrs., second half-year. M W, 10.

**12. General Agricultural Technology.** Assistant Professor SHAW.

A general course dealing comprehensively with the chemico-agricultural manufacturing industries of starch, glucose, and cereal preparations; essential and fixed oils and fats; textile and tanning materials, paper-making, hop-curing, etc.

3 hrs., first half-year. M W F, 10.

**13. Sugar-House Control.** Assistant Professor SHAW.

A laboratory course in the analysis of sugar-house products, raw, finished and waste; the analysis of sugar-house supplies, and the accurate calculation of losses. Materials for analysis will be furnished by one of the beet-sugar factories of the State.

6 hrs. laboratory, second half-year; 2 units.

**14. Vinification.** Assistant Professor BIOLETTI.

Lectures on methods of wine-making.

2 hrs., first half-year. Tu Th, 8.

**15. Zymology I.** Mr. HOLM.

Lectures (once a week) on the micro-organisms of fermentation, especially the moulds, yeasts, and bacteria occurring on grapes and in fermented liquors; with laboratory work in the purification of yeasts, the testing of varieties of yeasts.

Lecture W, 4 p.m.; laboratory M W F, 1-4. 4 units, first half-year.

**17. Wine Handling and By-products of the Winery.**

Assistant Professor BIOLETTI and Mr. HOLM.

Lectures and laboratory work on fining, filtering, pasteurizing wine, and the manufacture of grape-juice, vinegar, and tartars.

Lecture W, 1; laboratory W, 2-5. 2 units, second half-year.

**21. Analysis of Must and Wine.** Assistant Professor COLBY.

1 hr. lecture, 6 hrs. laboratory work; 3 units, first half-year.

Lecture Tu, 1; laboratory Tu Th, 9-12.

**23. Adulterations of Fermented and Distilled Liquors.**

Assistant Professor COLBY.

1 hr. lecture, 6 hrs. laboratory work; 3 units, second half-year.

Lecture Tu, 1; laboratory Tu Th, 9-12.



It is essential that students entering Courses 21 and 23 should have some knowledge of elementary chemistry; and previous experience in wine-making will be of material advantage.

**25. Flour Testing and Mill Control.** Assistant Professor SHAW.

A laboratory course devoted to the practical testing of flour; flour and wheat blending for improvement in quality; grading of flour, etc.

9 hrs., 3 units, first half-year. M W F, 1-4. Prerequisite: Chemistry 3 and 5A.

**27. Zymology II.** Mr. HOLM.

Investigation of special topics concerning the micro-organisms of interest to the wine, beer, alcohol, and other fermentative industries.

Lecture W, 4 p.m.; laboratory M W F, 1-4. 4 units, second half-year. Prerequisite: Course 15, Zymology I.

**37. Grading and Judging Grain.** Assistant Professor SHAW.

Practice in describing, scoring, judging, and inspecting cereals. Methods of breeding to improve cereals.

6 hrs., 2 units, first half-year. Tu Th, 1-4.

**GRADUATE COURSES.**

**36. Research in Chemico-Agricultural Technology.**

Assistant Professor SHAW.

**33. Advanced Instruction in Zymology.**

Assistant Professor BIOLETTI and Mr. HOLM.

Prerequisite: Course 15, Zymology I.

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**ANIMAL INDUSTRY.**

**UPPER DIVISION COURSES.**

**11. Animal Industry: Cattle, Sheep, and Swine.**

Assistant Professor MAJOR.

History, characteristics, and adaptability of the various breeds; practice in judging.

3 hrs., lectures M W F, 10. 3 hrs. practice by appointment. 4 units, first half-year.

12. **Principles of Breeding.**                      Assistant Professor MAJOR.  
1 hr., lecture M, 11. 1 unit, first half-year.
13. **Dairy Husbandry.**                              Assistant Professor MAJOR.  
A study of milk and the manufacture of milk products.  
1 hr., lecture Th, 10; 6 hrs. practice by appointment. 3 units,  
first half-year.
14. **Chemistry of Dairying.**                      Assistant Professor JAFFA.  
Lectures. 2 hrs., first half-year. Tu Th, 1.
15. **Laboratory Course.**  
Assistant Professor JAFFA and Mr. STEWART.  
Analysis of milk and dairy products, and detection of adulterants.  
6 hrs., first half-year; 2 units. Prerequisite: Chemistry 3 and 5B.
22. **Animal Industry: Horses.**                      Assistant Professor MAJOR.  
History, characteristics, and adaptability of the various breeds;  
a study of the different market classes.  
2 hrs., lectures. M W, 8.  
2 units, second half-year. Prerequisite: Animal Industry 11.
24. **Live Stock Management.**                      Assistant Professor MAJOR.  
The housing, feeding, care, and management of the various  
classes of live stock.  
2 hrs., lectures. M W, 10. 2 units, second half-year. Prerequisite: Animal Industry 11.
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## NUTRITION.

### UPPER DIVISION COURSES.

12. **Principles of Nutrition.**                      Assistant Professor JAFFA.  
Discussions of the functions of nutrients and the theories of  
digestion.  
2 hrs., first half-year. Tu Th, 2.
14. **Feeds and Feeding.**                              Assistant Professor JAFFA.  
Lectures on cattle foods. Practical applications of the principles  
of nutrition to the rational feeding of farm animals.  
2 hrs., second half-year. Tu Th, 1.

**16. Composition and Use of Human Foods: Food Adulteration.**

Assistant Professor JAFFA.

Lectures.

2 hrs., second half-year. Tu Th, 2.

**21. Laboratory Course.**

Assistant Professor JAFFA and Mr. STEWART.

Analysis of human and cattle foods, and detection of adulterants.

6 hrs., second half-year. 2 units. Tu Th, 2-5. Prerequisite:  
Chemistry 4 and 5B.

GRADUATE COURSE.

**31. Special Research in Animal Nutrition.**

Assistant Professor JAFFA.

Advanced course.

1 hr. lectures; 6 hrs. laboratory work; 3 units, second half-year.

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**VETERINARY SCIENCE.**

UPPER DIVISION COURSES.

**12. Veterinary Sanitary Science.**

Dr. HARING.

A general course dealing with the infectious diseases of domestic animals, their recognition and control.

2 units, second half-year. Lectures and recitations Tu Th, 9.  
Prerequisite: The first half-year of Hygiene 2 (Bacteriology).

**14. Veterinary Science.**

Dr. HARING.

Lectures briefly presenting certain facts concerning the anatomy and physiology of domestic animals. Some of the common non-infectious diseases will receive attention. Clinical demonstrations as opportunity offers.

1 unit, second half-year. F, 10.

**Bacteriology.** [See Hygiene 2.]

Assistant Professor WARD.

**MILITARY SCIENCE AND TACTICS.**

JOHN T. NANCE, Captain Ninth Cavalry, U. S. Army, Graduate U. S. Military Academy, Professor of Military Science and Tactics.

G. E. DICKIE, B.L., Assistant in Military Science and Tactics.

JULIUS KLEIN, B.L., Assistant in Military Science and Tactics.

**1. Practical Course.**

Professor NANCE, Mr. DICKIE, and Mr. KLEIN.

Exercises in Infantry Drill Regulations, Field Service Regulations, Manual of Guard Duty, and Firing Regulations for Small Arms.

2 or 3 hrs., alternating, throughout the year; 1 unit each half-year. M W alt. F, 11.

Prescribed for all able-bodied male students, including special students, during the first and second years of the undergraduate course; elective, during their third year, to sergeants (credit 1 unit each half-year), and, during their third and fourth years, to commissioned officers (credit  $1\frac{1}{2}$  units each half-year).

**2A. Theoretical Course.**

Professor NANCE and Cadet officers.

Infantry Drill Regulations and Manual of Guard Duty.

1 hr., first half-year; 1 unit. F, 5.

Prescribed for all able-bodied male students, including special students, during the first year of the undergraduate course.

**2B. Theoretical Course.**

Professor NANCE.

Lectures on small arms target practice, organization, discipline, the service of information, the service of security, marches, combat, ammunition supply, subsistence, transportation, shelter, and field sanitation.

1 hr., first half-year; 1 unit. W, 4.

Prescribed for all able-bodied male students, including special students, during the second year of the undergraduate course.

**PHYSICAL CULTURE.**

WALTER E. MAGEE, Director and Professor of Physical Culture.

GENEVRA E. MAGEE, Assistant in Physical Culture.

LOUISA A. PLACE, Assistant in Physical Culture.

JAMES W. RHODES, Assistant in Physical Culture.

GEBHARD H. PFUND, Assistant in Physical Culture.

All students are examined from time to time, with reference to their health and physical development, and appropriate exercises are prescribed. These exercises are conducted in classes, so far as is practicable. To those found unable to do class work, special instruction is given, and exercises adapted as nearly as possible to individual needs are prescribed. A supervision of student athletics is exercised by the department. The expenses for each student are four to five dollars for a regulation suit.

The Hearst Gymnasium and outdoor court are reserved for the exclusive use of young women. In suitable weather classes are conducted in the court.

All **undergraduate students** will be charged a semi-annual fee of one dollar and a half, in return for which the University will supply to each student locker and towels at the gymnasiums. This is payable at the time of registration each half-year.

**LOWER DIVISION COURSES.****1. Course for Men.**

Professor MAGEE, Mr. RHODES, and Mr. PFUND.

Exercises without apparatus; the developing appliances; chest-weights, dumb-bells, bar-bells, and Indian clubs. Exercises in walking and running; mat exercises; parallel bars, and the principles of wrestling.

4 hrs., throughout the year; 1 unit each half-year. Two sections. M Tu W Th, 4, 5. Prescribed to all undergraduate men during the first year of their attendance at the University.

**1A. Advanced Course.**

Mr. PFUND.

Exercises with parallel bars, vaulting-horse, horizontal bar. The saber, single-stick, and foil.

4 hrs., throughout the year; 1 unit each half-year. M W, 11; Tu Th, 3. Prerequisite: Course 1.

**1B. Corrective Exercises.**

Professor MAGEE.

Exercises adapted to students unable to take part in class work and those who desire to pursue special apparatus work. Mat exercises, the developing appliances, and breathing exercises.

4 hrs., throughout the year; 1 unit each half-year. M Tu W Th, 4.

**1C. The Art of Wrestling.**

Mr. RHODES.

4 hrs., throughout the year; 1 unit each half-year. M W Th, 11; F, 4. Prerequisite: Course 1.

**2. Course for Women.**

Professor MAGEE, Mrs. MAGEE, and Miss PLACE.

Exercises without apparatus; breathing exercises; the developing appliances; relaxing exercises, walking, running, and mat exercises; chest-weights, dumb-bells, bar-bells, Indian clubs. Recreative exercises.

4 hrs., throughout the year; 1 unit each half-year. Two sections. M Tu W Th, 3, 4. Prescribed to all undergraduate women during the first year of their attendance at the University.

**2C. Advanced Course for Women.**

Professor MAGEE.

Advanced exercises with chest-weights, Indian clubs, Swedish bombs, stall bars, ladders, and rings. The principles of fencing.

2 hrs.,  $\frac{1}{2}$  unit each half-year. M W, 2. Prerequisite: Course 2.

**2D. Corrective Exercises.**

Mrs. MAGEE.

Exercises adapted to students unable to take part in class work and those who desire to pursue special apparatus work. Mat exercises, the developing appliances, and breathing exercises.

4 hrs., throughout the year; 1 unit each half-year. M Tu W Th, 2.

**UPPER DIVISION COURSES.**

Training course for students intending to become teachers of physical training.

**3. History and Literature of Physical Training, and Public School Exercises.**

Professor MAGEE.

The gymnastic training in ancient Greece; modern training in Sweden, Germany, and England; physical training in the

United States, and its further development. Lectures, recitations and assigned reading. Breathing exercises; the proper manner of sitting, standing, walking, running; exercises without apparatus, figure marching, recreative games. Practice in teaching.

2 hrs., throughout the year; 2 units each half-year. Tu Th, 1.

**4. Human Anatomy.**

Professor MAGEE.

Skeleton (number and forms of bones, spine, thorax, upper and lower extremities); articulations (structures composing the joints); muscles and fasciae (general description of muscle, tendon, aponeurosis, fascia); illustrated by charts and diagrams, as well as by the skeleton in the articulated and single form. Lectures and demonstrations on the action of the muscles and methods of developing them.

2 hrs., first half-year; 2 units. M W, 1.

**5. Anthropometry and Prescription of Exercise.**

Professor MAGEE.

History of anthropometry; Greek standards, description of modern instruments; the technique of measurements. Acquired deformities and their remedies; testing and examining individuals to note variations from the normal and to ascertain their fitness for particular exercises.

2 hrs., second half-year; 2 units. M W, 1. Prerequisite: First half-year of Course 4.

NOTE.—The department will, in general, recommend as qualified to teach Physical Culture only such graduates as have passed with credit in addition to the prescribed work, Courses 1A, 1B, for men, 2D, 2C, for women, and Courses 3, 4, and 5.

## COLLEGE OF MEDICINE.

The instruction of the first two years of the medical course is given in Berkeley, and the work there taken may also be counted towards the bachelor's degree in the College of Natural Sciences for those who have completed the pre-medical course in that college. For further information reference should be made to the University Register, and to the special Announcement of the College of Medicine.

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### ANATOMY.

JOSEPH MARSHALL FLINT, M.D., Professor of Anatomy.

IRVING HARDESTY, Ph.D., Assistant Professor of Anatomy.

ROBERT ORTON MOODY, M.D., Assistant Professor of Anatomy.

ADELBERT WATTS LEE, M.D., Assistant Professor of Anatomy.

EDWARD MILLER, Technical Assistant.

1. **Histology.** Professor HARDESTY.  
First year, 4 laboratory periods, 4 lectures a week, for 9 weeks.  
3½ units.
2. **Microscopic Organology.** Professor HARDESTY.  
First year, 4 laboratory periods, 4 lectures a week, for 9 weeks.  
3½ units.
3. **Neurology.** Professor HARDESTY.  
First year, 4 lectures, 4 laboratory periods a week, for 9 weeks.  
3½ units.

### SYSTEMATIC HUMAN ANATOMY.

4. **Osteology.** Professor MOODY.  
Each student is loaned a skeleton and is required to model in clay and draw each bone in the body.  
First year, 6 half-days a week, for 8 weeks. 4½ units.
5. **Head and Neck.** Professor MOODY and Dr. LEE.  
First year, 6 half-days a week, for 7 weeks. 4½ units.
6. **Arm and Thorax.** Professor MOODY and Dr. LEE.  
First year, 6 half-days a week, for 7 weeks. 4½ units.



**7. Leg and Abdominal Viscera.** Professor MOODY and Dr. LEE.

First year, 6 half-days a week, for 7 weeks. 4½ units.

In his second year the student must repeat at least two of Courses 5, 6, and 7, provided he has already dissected the entire body in his first year. Research will be accepted in lieu of these courses.

**8. Special Anatomy for Physicians and Advanced Students.**

Professor MOODY.

Hours arranged to suit applicants. 4-8 units.

**9. Research.**

Professors HARDESTY and MOODY.

Students and others who are sufficiently prepared will be allowed to undertake research upon original problems under the direction of the head of the department. A certain number of units in Course 9 will be accepted in lieu of the required systematic anatomy of the second year from students who have shown marked ability in their work.

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**PHYSIOLOGY.**

See pages 150-151 of this Announcement. Courses 2, 3, 4, 5, and 13 as there announced are intended for students in the College of Medicine.

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**PATHOLOGY.**

ALONZO ENGLEBERT TAYLOR, M.D., Professor of Pathology.

ARCHIBALD R. WARD, B.S.A., D.V.M., Assistant Professor of Bacteriology and Superintendent of the State Hygienic Laboratory.

WILLIAM T. JANE, Technical Assistant.

Instruction in pathology is given in the Hearst Laboratory of Pathology in Berkeley during the second year, and at the University of California Hospital and the City and County Hospital in San Francisco during the fourth year.

**1. Morphological Pathology.**

Professor TAYLOR.

The course includes instruction upon the chief organs and tissues in the order of their importance.

4 lectures, 12 hrs. laboratory work a week, 18 weeks. 8 units.

Prerequisite: Completion of the course in first-year histology and microscopic anatomy.

**2. Chemical Pathology.**

Professor TAYLOR.

In this course disease is studied from the point of view of disturbed functionation; this and the course previously detailed contrast pathological physiology with pathological anatomy.

5 lectures, 15 hrs. laboratory work a week, 9 weeks. 5 units.

Prerequisite: Completion of the first-year course in chemical physiology.

**3. Bacteriology.**

Assistant Professor WARD.

A course upon general microbiology and pathologic bacteriology.

5 lectures, 15 hrs. laboratory work a week, 9 weeks. 5 units.

Prerequisite: Completion of the first-year course in histology and microscopic anatomy.

**4. Autopsy Course.**

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During the fourth year an autopsy course is conducted in the City and County Hospital.

**Research Department of Hearst Pathological Laboratory.**

The private laboratories of pathology are installed with equipments for original work along morphological and chemical lines. These laboratories are open to physicians and students desirous of doing research in pathology. Students are urged to undertake original work during their undergraduate years. The sole prerequisite to admission is adequate training. The laboratories are under the direction of the Professor of Pathology.

## CALENDAR FOR OPENING OF FIRST HALF-YEAR, 1907-08.

Monday, August 5.—Undergraduate Applications for Admission, and recommendations issued by the principals of accredited schools, should be filed with the Recorder of the Faculties on or before this date.

Thursday-Tuesday, August 8-13.—Matriculation Examinations, at Berkeley, for the Academic Colleges and Hastings College of the Law.

Wednesday, Saturday, August 14-17.—Reëxaminations and special examinations.

Friday, Saturday, Monday, August 16, 17, 19.—All officers of instruction in the colleges at Berkeley to keep office hours each day, from 9 a.m. to 12 m.

Friday, Saturday, August 16, 17, 8:30 a.m. to 4:30 p.m., at California Hall.—Admission certificates issued to intrants; Registration of New Students.

Monday, August 19, 8:30 a.m. to 5 p.m., in California Hall.—Registration of Old Students.

Tuesday, August 20, 8 a.m.—Instruction in all classes begins.

## CALENDAR FOR OPENING OF SECOND HALF-YEAR, 1907-08.

Saturday, January 4.—Applications for admission in January and applications for cards of admission to the entrance examinations in January, to be filed.

Monday, January 6.—Second half-year in the Academic Colleges and in Hastings College of the Law begins.

Monday-Saturday, January 6-11.—Examinations in the Academic Colleges for the removal of matriculation deficiencies.

Monday, January 13.—Registration of students in the Academic Colleges for courses of the second half-year.

Tuesday, January 14.—Instruction in all classes begins at 8 a.m.

*For further details concerning the Calendar consult the Registration Circular for August, 1907, published in June, 1907; the Registration Circular for January, 1908, to be published in December, 1907; and the Register for 1906-07, to be published in August, 1907.*

## REGISTRATION.

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**To the Student.** In making up your list of courses, consult this **ANNOUNCEMENT OF COURSES** and such supplementary announcements as may have been issued; consult, also, the **SCHEDULE OF EXERCISES**. In all cases in which the **SCHEDULE** differs from the **ANNOUNCEMENT** as to the hours at which classes are to meet, the **SCHEDULE** should be followed. Give the exact name and number of each course, following in each case the latest announcement. Freshmen should confer with their advisers regarding plans of study.

(For the requirements for the several degrees, see the **University REGISTER**.)

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## REGULATIONS GOVERNING CHOICE OF STUDIES.

1. Regular students who are free from deficiencies will be registered for not to exceed nineteen units of new work. *But in no case will a student in the Upper Division of the College of Letters, Social Sciences, Natural Sciences, or Agriculture be registered for more than sixteen units.* Regular students with deficiencies will be limited to sixteen units. Freshmen and Sophomores who are taking the *prescribed courses* in Physical Culture, Hygiene, or Military Science, may add these courses to the maxima as stated herein. Work reported by the instructors as "incomplete" is regarded as deficient work.

2. A regular student may be required or allowed to take a smaller amount of work than the minimum stated above.

3. Special Students have free election, subject to the requirement that they confine their attention to some special study and its related branches. The study-list of every Special Student must be approved, before filing with the Recorder, by the student's Adviser. During their first half-year at the University special students may take not more than nineteen units a week; and after the first half-year they may take nineteen units a week, provided they have incurred no deficiencies.

4. Limited Students have all their studies elective, but they are limited to thirteen units a week.

5. No student will be permitted to enter upon the study of any subject if the officer of instruction in charge of that subject is satisfied that by reason of lack of preparation he is not competent to undertake it. This rule takes precedence of all others.

# INDEX.

	PAGE		PAGE
Agricultural Chemistry.....	190	Horticulture.....	192
Industries.....	197	Hygiene.....	152
Agriculture, Horticulture, and Entomology.....	188	Irrigation.....	176
Anatomy.....	206	Italian.....	107
Animal Industry.....	199	Japanese.....	58
Anthropology.....	49	Jurisprudence.....	16
Arabic.....	55, 56	Latin.....	69
Aramaic.....	55	Law.....	16
Architecture.....	185	Mathematics.....	111
Argumentation.....	83, 84	Mechanical Drawing.....	183
Assaying. <i>See under</i> Mining and Metallurgy.		Mechanical Engineering.....	161
Astronomy.....	125	Metallurgy.....	178
Bacteriology.....	153	Military Science and Tactics.....	202
Biology. <i>See under</i> Zoology, Physiology, and Botany.		Mineralogy.....	159
Botany.....	141	Mining and Metallurgy.....	178
Chemistry.....	134	Music.....	53
Chemistry, Agricultural.....	190	Nutrition.....	200
Chinese.....	57	Oriental Languages.....	57
Civil Engineering.....	166	Palaeontology.....	154, 156
Drawing.....	183	Pathology.....	207
Drill, Military.....	202	Petrography.....	152
Economics.....	37	Philology, Germanic.....	95
Education.....	9	Romanic.....	108
Electrical Engineering.....	161	Philosophy.....	3
Engineering. <i>See under</i> Mechanical Engineering, Civil Engineering, Mining and Metallurgy.		Physical Culture.....	203
English.....	78	Physics.....	118
Entomology.....	193	Physiology.....	150, 207
Forensics.....	84	Plant Pathology.....	197
French.....	102	Polish.....	109
Geography.....	130	Political Science.....	32
Geodesy. <i>See under</i> Astronomy.		Psychology. <i>See under</i> Philosophy.	
Geology.....	154	Romanic Languages.....	100
German.....	93	Romanic Philology.....	108
Germanic Philology.....	92	Russian.....	109
Gothic.....	92	Sanskrit.....	61
Graduate Courses. <i>See under the various Departments.</i>		Saxon, Old.....	97
Greek.....	63	Semitic History.....	54
Modern.....	68	Semitic Languages.....	54
Gymnasium.....	203	Slavic Languages.....	109
Hebrew.....	54	Soils.....	190
History.....	23	Spanish.....	105
		Syriac.....	55, 56
		Teachers' Courses. <i>See under the several Departments.</i>	
		Veterinary Science.....	201
		Zoology.....	145

[3500-7, '07]

